DOCUMENT RESUME

ED 125 238 FL 006 084

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TITLE Variation and Linguistic Theory.
INSTITUTION Center for Applied Linguistics, Arlington, Va.
PUB DATE 73
NOTE 169p.

EDRS PRICE MF-$0.83 HC-$8.69 Plus Postage.
DESCRIPTORS *Creoles; Descriptive Linguistics; Diachronic Linguistics; *Dialects; Dialect Studies; Diglossia; Generative Phonology; *Language Usage; *Language Variation; *Linguistic Theory; Pidgins; *Sociolinguistics; Synchronic Linguistics; Transformation Generative Grammar
IDENTIFIERS *Polylectal Grammar

ABSTRACT

This volume presents principles and models for describing language variation, and introduces a time-based, dynamic framework for linguistic description. The book first summarizes some of the problems of grammatical description encountered from Saussure through the present and then outlines possibilities for new descriptions of language which take into account sociolinguistic factors. For instance, a static framework would view creole situations as "freak" situations and creoles as necessarily unstable and rapidly changing. A dynamic framework would endorse the Saussurian paradox that competence is looked for exclusively in the individual, but variety is sought in society. A dynamic framework would hold that competence is polylectal; what language-users know about communicating with others more nearly represents their language competence than the subset of this knowledge exhibited in production. The bulk of the text centers around the enumeration of principles and the presentation of models for variation theory. A paper on feature marking and weighting is appended. (CAL/DB)

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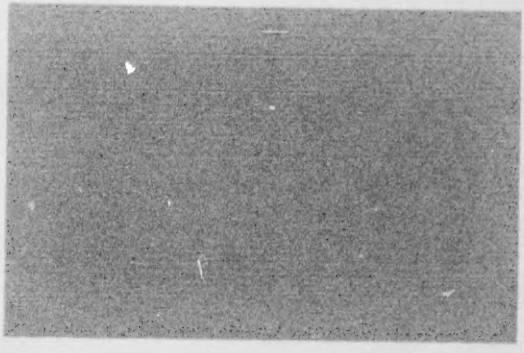

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CENTER FOR APPLIED LINGUISTICS

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1611 North Kent Street
Arlington, Virginia 22209

International Standard Book Number: 37281-032-1
Library of Congress Catalog Card Number: 73-84643

Printed in the United States of America

Dedicated to

HANSLI

and the Menehune gardens of

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PREFACE

This monograph was originally put together as the basis for talks given at the 1971 Linguistic Society of America Summer Institute at the State University of New York, Buffalo. Many revisions and additions have altered the form in which it was first circulated among colleagues. It may avert misunderstanding if I here distinguish the role of the historian of ideas from that of the advocate of ideas. Both ought to credit the sources of ideas which have been advocated in such a manner as to have been influential. The historian has two additional tasks which do not seem to me to belong to the job of the advocate of ideas. He needs to record items that went unnoticed and lacked influence, especially if later they should have turned out to have been significant for the present. And the historian also needs to ascertain what a scholar (such as Saussure) really intended to convey. The advocate of ideas, on the other hand, may limit his attention to the effects which in actual fact eventuated out of a man's teachings, whether through infelicitous changes of mind or through distortions caused by his editors. This present study definitely belongs to the advocate of ideas category and not to the historical one. It is the writer's hope, not that the principles and other proposals included in this writing will necessarily prove correct; rather that they will show the feasibility of dynamic grammars and stir up discussions which -- whether they prove these proposals right or wrong -- will advance our discipline on the road toward a more realistic and adequate linguistic theory.

In preparing this volume, the writer has had the aid of both colleagues and students. The interest and help of William Labov is gratefully acknowledged, although nothing in the following pages should necessarily be assumed to be in agreement with his present views,

given the differences in emphasis between us. A general acknowledgement here, and the references in the text itself, will have to suffice for those other colleagues and students who have made me aware of errors and weaknesses in my positions. A detailed listing, if at all possible, would be too long and too prone to invidious, if accidental, omissions. But the writer's students have been a constant help in exposing flaws in his attempts to arrive at working models for formulating polylectal grammar, and have also helped in providing illustrative analyses for the following pages.

Thanks are due Allene Guss Grognet who edited this volume and Freda Ahearn who typed the manuscript for publication. Finally, grateful acknowledgement is made to the National Science Foundation for funds given to the School of Languages and Linguistics, Georgetown University, for its Sociolinguistics Program, which in turn made time for revising this work possible.

C.-J.N.B.

Washington, D.C.

June 1973

CONTENTS

	PREFACE	iii
1	PROBLEMS WITH OLD ASSUMPTIONS	1
	1.0 Introduction	1
	1.1 The homogeneity paradox	2
	1.2 The temporal paradox	13
2	THE NEW FRAMEWORK	21
	2.0 General observations	21
	2.1 Justification of polylectal grammars	23
	2.2 Pragmatic competence	29
	2.3 Paradigm characteristics and contrasts	31
3	DIRECTIONALITY AND RATE IN VARIATION	36
	3.0 Directionality and markedness	36
	3.1 Generation of subsystems	43
	3.2 Exposition of metalinguistic principles	55
	3.3 Interrelations of time factors in rules	60
4	THE WAVE MODEL, LANGUAGE COMMUNITIES AND SPEECH COMMUNITIES	65
	4.0 The language community	65
	4.1 The wave model	67
	4.2 The variable rule for /ī/ in English	86
	4.3 Overlapping waves	99
	4.4 Algorithms for converting unilinear implicational patterns into multi-dimensional sociolinguistic patterns in a speech community	101
	APPENDIX: FEATURE MARKING & WEIGHTING	110
	NOTES	126
	BIBLIOGRAPHY	150

1 PROBLEMS WITH OLD ASSUMPTIONS

1.0 Introduction. During the past few years, linguists working in different branches of the discipline have increasingly shown discontent with the framework of axioms for descriptive work which have been widely accepted for almost half a century. Their frustrations have led to attempts to escape from the procrustean framework of idealized oppositions by devising models that handle variation and continuums in linguistic data, whether semantic or phonological. While it would carry the present writing far beyond its necessary limits to fully document such developments,[1] a proper perspective for following the remainder of this book does seem to require mentioning in summary fashion the main lines of these developments. First in time has been the work of those variationists or lectologists, mostly with backgrounds in historical linguistics or creole studies, whose work so far has mostly concentrated on the social variation of language in speech communities. Then there are the massive researches of the generative semanticists, whose investigations have led them to an awareness of the role of communicative competence in the use of language and to a new understanding of fuzziness in semantic continuums which goes well beyond previous assumptions. At least two schools of natural phonology, as well as the generative semanticists, have been increasingly taking notice of implicational patterns, already familiar in recent years to variationists.

Clear convergences among these groups, whose members have often overlapped, has been taking place on several fronts. The theoretical importance of fine (low-level) variation in empirical data is rapidly being acknowledged by the parties just mentioned. Continuums are replacing discrete breaks in implicational series or squishes, fuzziness in logic, etc. The role

of force (intention or attitude) and presupposition is now apparent in both phonology and syntax. Discourse analysis is replacing sentence analysis. The use of language in its social contexts is now recognized to have important effects on the grammar. This is beginning to change old beliefs about idiolects and dialects. The role of time in 'synchronic' language patterning is gaining some recognition, although this has hardly begun, or at least not gone very far, in various quarters. These developments are having far-reaching effects on historical linguistics (cf. Bailey 1973a) and on transcriptional phonetics (cf. Bailey MS). And even those who espouse the assumptions of the old framework have begun to question previously accepted views (e.g. those concerning rule ordering and prosodic analysis) and are taking increasing interest in formerly disdained topics (e.g. syllable-sensitive phonological markings).

The contribution to the new developments embodied in the present treatment of variation in English phonology will consist of a discussion of the problems inherent in widely held Saussurian doctrines and the developing and illustrating of dynamic models for describing the patterning of variation within a framework that is not purely synchronic, but which includes a temporal dimension.[3]

1.1 The homogeneity paradox. At the beginning of the second decade of this century, Ferdinand de Saussure (1962:30 = 1959:14) proposed a distinction that was destined to have ominous consequences.

> In separating langue from parole, we simultaneously separate: (1) what is social from what is individual; (2) what is essential from what is accessory and more or less accidental.

Saussure often spoke of parole as equivalent to individual exécution, or production. For him, the object of linguistic study was langue, which he likened to the score of a symphony, not parole, which he likened to the performance of that symphony by an orchestra--with all its unintended mistakes. It is clear that the distinction between langue and parole entails a concentration on the essential and a disregard for what is

conceived to be accidental.[3] While linguists could hardly demur to such sentiments,[4] there are serious disagreements among them over where the line is to be drawn between langue and parole, or rather between what is viewed as essential and what is viewed as accidental.

Saussure (1962:37 = 1959:18) himself was clear that the study of parole belongs to "an ensemble of disciplines whose place in linguistics is due only to their relation to langue":

> The study of language therefore comprises two divisions: the essential one has as its object langue, which is social in its essence and independent of the individual; this study is purely psychological; the other, secondary [study] has as its object the individual aspect of language, that is, parole, including phonation; it is psychophysical.

He goes on to add that his definition of langue "supposes our setting aside all that is foreign to its organism, its system, in a word, everything that is referred to by the term 'external linguistics'" (1962:40 = 1949:20). He allows that external linguistics includes many important things, especially linguistic matters that have to do with ethnology. He also mentions issues that today might be referred to under the heading of the sociology of language. And then he lists everything that has to do with "the geographical extension of languages and dialectal splitting" (1962:41 = 1959:21); in short, what has traditionally been called dialectology. While conceding the merits of the study of "external linguistic phenomena" (1962:42 = 1959:22), Saussure firmly denies the validity of the view that the internal linguistic organism cannot be known without studying such external phenomena.

It is easy to discern the contradiction between this point of view and Saussure's social view of langue quoted earlier. His acceptance of the view that linguistics should pursue the study of transpersonal phenomena (those which are "independent of the individual") does not harmonize with his refusal (see §1.2) to grant the legitimacy of studying transpersonal patterns in which a time factor intervenes, e.g. the varieties of a

language spoken by father and grandson in the same household. As will be seen in the next section, Saussure makes a radical distinction between the diachronic and the synchronic. His four-way splitting up of descriptive, historical, dialectological, and ethnographic linguistics has been accepted with few demurrers (most notably by Roman Jakobson). This has resulted in a degree of theoretical isolation among the workers in each sub-discipline from the advances in the others. The fission of linguistics into so many different methods and theoretical outlooks for the respective pursuits has been deleterious to the entire discipline and has been acutely felt by the few linguists who have pursued investigations in several of the sub-disciplines. This has been exacerbated by specializations within a given sub-discipline, e.g. phonology or syntax.

One who took seriously Saussure's social characterization of langue, or at least of language, was Edward Sapir. After comments full of insight on the differences between individual and communal variation in English (1921:157), he went on to speak (158) of "something like an ideal linguistic entity dominating the speech habits of the members of each group". But such a sentiment, more or less isolated in America, was not destined to have the influence that Leonard Bloomfield's point of view was to wield. Despite a cautious attitude toward the variation which he recognized to be omnipresent even in individuals' speech, Bloomfield's understanding of science induced him 'provisionally' to abstract from the 'inessential differences' between the speech of Midwesterners and Englishmen or Southerners (1933:45). This being so, why then did he not attempt a descriptive formulation of English as a whole, rather than simply of one kind of Chicago English? The answer to this question leads us to a slightly broader survey of the development of contemporary linguistic theory.

For the past half century, the linguists that have had the most influence on the discipline have regarded it as feasible and worthwhile to limit their attention to invariant samples of language. Although the limitations of linguistic theory in their day can account for some of this attitude, there have been those who, so far from fearing that this procedure would vitiate their

work, have insisted that it will lead to an adequate theory of human language. At issue is the extent to which a linguistic description should abstract from variation in a language beyond the level of systematic phonetics, a level of abstraction excluding the random deviations which may be called performance variations.

It is something of a paradox that the greatest degree of abstracting away from data variation has been advocated by the empiricists. Linguistic thought in the thirties and forties in the United States was dominated by a positivist philosophy of science and behaviorist methodology. The empiricist-positivist orientation (derived from medieval nominalism through Romanticism) stressed the reality of the individual datum and was loath to admit the reality of abstract relations among data. This outlook generally brings in its train cautions against reifying 'natures'. Bloomfield's way of having his orientational cake and eating it too was to attend to a particular set of homogeneous data as a means of abstracting away from the variation that he admitted to be inherent in all linguistic data.[5]

His thought was developed by his followers in such a way as to insist on abstracting not only from interpersonal differences, but even from the stylistic differences of a single speaker-hearer. Abstracting from variation (and I omit discussion of the fallacy discussed by Postal (1968:12-18)) was carried to such lengths by Bloomfield's followers that no patterned variation was taken to be relevant to grammars except the distribution in mutually exclusive (complementary) surficial environments of phones and morphs in a single style of a given speaker. The classic example of this doctrine is the following passage from Bernard Bloch (1948:7-8):

> Definition. The totality of the possible utterances of one speaker at one time in using a language to interact with one other speaker is an idiolect... As for the words 'at one time',...they are included in the definition only because we must provide for the fact that a speaker's manner of speaking changes during his lifetime. The phrase 'with one other speaker' is intended to exclude the possibility

> that an idiolect might embrace more than one style of speaking....
>
> Definition. The process of discovering [sic] different auditory fractions of an idiolect and their different arrangements is phonological analysis.
>
> Definition. A class of idiolects with the same phonological system is a dialect.

Recent researches, however, have undermined the utility of the concept of an idiolect. In Labov's (1966:6-7) words:

> It is generally considered that the most consistent and coherent system is that of an idiolect... According to this view, as we consider the speech of [any] individual over longer periods, or the combined dialects of a neighborhood, a town, or a region, the system becomes progressively more inconsistent....
>
> The present study adopts an entirely opposite view...in New York City, most idiolects do not form a simple, coherent system: on the contrary, they are studded with oscillations and contradictions....
>
> Traditional dialect studies have shown that isolation leads to linguistic diversity, while the mixing of populations leads to linguistic uniformity. Yet in the present study of a single speech community, we will see a new and different situation: groups living in close contact are participating in rapid linguistic changes which lead to increased diversity, rather than uniformity.
>
> Our understanding of this apparent paradox stems from the recognition that the most coherent linguistic system is that which includes the...speech community as a whole.

(Cf. also Labov 1972b:109.)

While there have been scholars working in the same general framework as Bloomfield and Bloch, e.g. Gleason (1961:392), who have conceded the worth of what Saussure called secondary studies of external

linguistic phenomena, the lack of an impressive project in this direction argues for the limitations of their orientation. Less than twenty years ago Hockett (1955:14) was once willing to relegate semantics and phonetics, the two poles which grammars are supposed to link, to the subsidiary roles of "peripheral subsystems".[6]

The positivist rejection of universals and the empiricist rejection of abstract explanations in the pre-transformational orientation are uncompromisingly stated by Joos (1966:96).

> ...in the long run [Praguean] ideas were not found to add up to an adequate methodology [sic]. Trubetzkoy phonology tried to explain everything from articulatory acoustics [sic] and a minimum set of phonological laws taken as essentially valid for all languages alike, flatly contradicting the American (Boas) tradition that languages could differ from each other without limit and in unpredictable ways, and offering too much of a phonological explanation where a sober taxonomy would serve as well.
>
> Children want explanations, and there is a child in each of us; descriptivism makes a virtue of not pampering that child.

The advent of Noam Chomsky signaled a swing of the pendulum to the opposite extreme of idealism or rationalism, a climate favorable to universals and unfavorable to unpredictability. Chomsky not only countered the positivist position with a seeking for universals, which had already been mooted by Roman Jakobson and Joseph Greenberg, but also checked taxonomy with an insistence on explanation. He countered behaviorism with mentalism, and empiricism with abstract underlying representations. And a newer, conceptualist orientation is now accepting naturalness as the basis of both explanation and prediction.[7]

Following Jakobson, Chomsky and Morris Halle promoted a broadening of the restrictions on the analysis of variation which went at least one degree beyond mere phonic and morphic complementarity. For they made

morphophonic relationships the underlying representations of phonological analysis, paralleling abstract representations in syntactic analysis. But those in the transformational school were not willing to endorse further broadening to provide abstract underlying representations for transtylistic and transpersonal variants in whole language systems. This was so even though it is part of speakers' knowledge of their language to use different styles and part of hearers' knowledge to communicate with speakers employing different variants of the language system from their own. Although for opposite reasons, Chomsky endorsed the Blochian view of interstylistic and interpersonal variation. His strongly Saussurian attitude is clear in this statement by him of the doctrine of homogeneity (1965:3-4):

> Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as [performance variations]. This seems to me to have been the position of the founders of modern general linguistics, and no cogent reason for modifying it has been offered.

Whatever mental property enables children to internalize grammars can be just as adequately and more easily discovered from homogeneous data as it can from complex heterogeneous data. What language-users know about the function of their language, including their ability competently to communicate with speakers having different grammars, is to be investigated in secondary studies of performance. Formal grammatical competence is inadequate to account for anything but the imaginary desert-island situation.[8]

While the simplifying idealization advocated by Chomsky has probably been a necessary step in the development toward an adequate theory of language, sociolinguists, variationists, and generative semanticists maintain that even formal grammatical competence has to include the functional knowledge of how to communicate. Their Platonic abstraction of idealized essences from the fluctuation of phenomena has not

prevented Chomsky and Halle (1968:49,54) from believing that different varieties of a language have many 'early' rules in common. The idealistic orientation thus permits a degree of abstraction which paradoxically embraces more empirical variants than what linguists of the empiricist persuasion allow.

The interests of some linguists who appear to subscribe to the homogeneity doctrine have led them to a concern with how understanding occurs among different varieties of a language. The early attempt of Klima 1964 discussed rules and different orderings of rules for converting one grammar to another. Such grammars could represent different styles of a single speaker. Rules like Klima's, variously known as extension, linking, shifting, and conversion rules, have been defended in Butters 1971, where they are accorded status in competence, and in Agard 1971. Troike's (1969) generative diaphonemic rules are not thought of as part of language-users' competence. In a study of Black Vernacular English (hereafter BVE), Loflin 1971 (the relevant paragraph is absent in earlier versions of this writing) proposed that language varieties with similar deep structures are related by means of low-level rules belonging to a special 'component'. Houston (1970:11) speaks in favor of contingency rules, which belong to systematic performance, "are quantificational in the sense that they are marked for general probability of occurrence in a particular way", and convert a "basic competence" into "dialect forms, into registral forms, and into the regular patterns of idiolect...."

The issue that has been the concern of these writers and the variationists revolves around the inevitable differences among even speakers of the same 'dialect'.[9] The Chomskian teaching that that universal mental property, the faculté de langage, can be sufficiently discovered with restricted and invariant data is the basis for obviating the otherwise contradictory character of these two observations: (1) the non-universal character of an idiolect within a language system; (2) the futility and unrewarding nature of investigating all the idiolects of a language. Elliott, Legum, and Thompson (1969:52) have justly scored the attitude towards data

differences that has prevailed, which they have summed up in the words, "You describe your dialect, I'll describe mine." This procedure has not prevented such linguists from basing universal conclusions on data that are not even universal for the population of a single classroom. Finally, it falls something short of professionalism to refer to isolated differences as 'dialectal', in view of the traditional notion of dialects as mutually intelligible varieties of a language separated by bundles of covarying phenomena, even if this notion is hardly a useful or serviceable one.

It will be worth reflecting that, if an interpersonal dialect is as simple an abstraction as this procedure and Bloch's previously mentioned definition imply, it poses fewer analytical problems than an internalized interstylistic grammar that generates all the (competence) variants in an individual language-user's language. There are amply attested languages in which allegro-tempo neutralizations result in fewer vowels or consonants in rapid tempos and informal styles than in slower tempos and formal styles[10] In actual fact, interstylistic and interpersonal differences are quite comparable in terms of writing grammars that generate both, as linguists must do if they are to account for language-users' knowledge of their language. Labov 1966 and much subsequent work have provided evidence that some class differences among different speakers covary with and are equivalent to style differences in the usage of the members of a single class. This being so, Loflin's suggestion already referred to would require a special 'component' for shifting from the grammar used in one style to that used in another.

It should also be clear that the same difficulties are posed by abstracting from idiolects[11] to dialects as by abstracting from dialects to languages; so why not formulate grammars of entire languages that generate all their subvarieties and be more comprehensive?[12]

This rather obvious point was made more than eighty-five years ago by Hugo Schuchardt (1971:M-14), who happens to have been a creolist as well as dialectologist: "...therefore everything which is valid of the relationship between dialects of any level has to be valid also of that between idiolects...." Schuchardt was clear that every form of speech is a transitional sort of thing, and he knew that the closer you

get to the individual, the more you will find deviations from the regularity of the overall system. Both points have been amply confirmed in recent research.

If one has read the writings of the pioneers of Romance dialect geography or taken a look, for example, at the data of the North of England (cf. Kolb 1966 and see Fig. 10, pg. 87, or if one has considered the failure of structuralist attempts to make the term dialect meaningful, one will have difficulty accepting the traditional characterization of a dialect, as set forth above. Isoglosses do not usually bundle in a neat manner without a great deal of fudging, including the ignoring of overlaps at the boundaries of phenomena which are mostly located in different parts of the map; everyone speaks transitional dialects (cf. Weinreich et al., 184), to use traditional terminology without implying the existence of varieties of language which are not transitional in the sense being considered. Linguistically adjacent varieties of a language are frequently dispersed in spatial mappings, which detracts from the utility of such maps for formulating grammars of entire languages. If cross-hatchings of class, sex, age, and other social differences are superimposed on maps of regional variation (for some given combination of social parameters), the traditional notion of dialect becomes hopelessly inadequate and at war with reality![3] And the criterion of mutual intelligibility, long known to be of little use, loses all pretenses to validity if (Bailey 1972) speakers of marked phenomena are able to understand speakers of unmarked phenomena with greater readiness than conversely. An alternative to dialects will be proposed later in §2.1.

In what follows, the terms lect and isolect will be employed in place of dialect. Lect is a completely non-commital term for any bundling together of linguistic phenomena![4] Isolects are varieties of a language that differ only in a minimal way, say by the presence or weighting (see §3.1) of a single feature in a rule, or by a minimal difference in rule ordering. A single isogloss stands between two isolects of a language.

In view of what has been said, it should be clear that the time has come to abandon the previously orthodox view that language-users have competence only in their own 'dialect'. The view stated several years ago by Becker (1968:7) was:

> Whenever a rule is found in more than one dialect, it must be remembered that its presence is motivated entirely by the requirements placed on the form of a generative phonology and the data of the dialect in question. No attempt has been made to set up common underlying forms for the three dialects. The independence of the three phonologies presented here cannot be over-emphasized, for without it this [writing] could be construed to be not a synchronic phonological study, but rather a kind of exercise in the application of the comparative method of historical linguistics to some closely related German dialects.

The object of the following sections is precisely to demonstrate that the dichotomy between the diachronic and synchronic approaches just suggested is a misguided one, and that children do indeed possess the reconstructive and comparative methods of internalizing what they know of their language and its variations--knowledge that extends beyond their own 'idiolects'. While I am not contending that diachronic and synchronic studies are the same thing, I am contending, and have given reasons (in Bailey 1972) for believing, that their essential methods are the same. We need no longer feel guilty, as Bloomfield may have when he realized that his avowedly descriptive analysis of Menomini [1939(1964):106] looked like a historical analysis.

As the Saussurian point of view won acceptance, fewer dissentient voices were raised, and the Saussurian paradox prevailed. Labov (1972b:105) expresses this paradox as follows:

> The social aspect [langue] of language can be studied through the intuitions of any one individual, while the individual aspect [parole] can be studied only by sampling the behavior of an entire population.

But perhaps a discerning reader will suppose that the writer has fallen into a paradox of his own. On the one hand, I have maintained that the structuralists

and transformationalists, in their insistence on the homogeneity of their descriptions, have abstracted too far away from the data; on the other hand, I have implied that grammars ought to abstract beyond the idiolectal level to a much higher and more abstract transpersonal level. The apparent paradox evaporates when it is seen that my position is one in which it is maintained that, whatever the level of abstraction represented by a grammar may be, it should contain underlying representations and rules which will generate all the systematic variation in the data at the systematic phonetic level of every lect abstracted from. Thus the abstract and empirical issues are resolved without slighting either.

1.2 The temporal paradox. One of Saussure's most memorable statements asserted that it is the "time factor" that causes linguistic differentiation (Saussure 1962:271 = 1959:198). Continuing, he says: "Geographical diversity ought to be thought of as temporal diversity." One could go further and say that diversity in social space ought to be thought of as a function of the time factor. Social space is divided by the barriers of space, age, sex, and classes (whether based on birth, occupation, economic status, educational attainment, ethnic or religious background, future aspiration, etc.) and whatever social factors determine different styles of speaking, whether the status of the interlocutors or the loftiness of the subject. New phenomena begin--at first variably and in limited linguistic environments--in some corner of social space defined by the conjunction of values for each sociological parameter. In the manner prescribed by the wave model and accompanying sociolinguistic algorithms (see §§4.1,4), the change spreads in time from one adjacent set of social characteristics to the next and from more restricted to more general linguistic environments. The effects of time are seen in the order of change and in the resulting patterns. (Cf. also Weinreich et al., 155.)

Saussure, an Indo-Europeanist of the very first calibre, began with the good intention of ridding language descriptions of an atomistic approach and of historically valid, but psychologically invalid, analyses. If his notion of langue counteracted his social

view of language, his good intentions for arriving at psychologically valid formulations also issued in what I hope to show in the following section is a psychologically invalid result. The attempt artificially to freeze language data and ignore the on-going nature of linguistic change has forced linguists into strait-jacketed descriptions which exclude a vast amount of linguistic knowledge or language-user competence, including the elemental facts of a grandchild's communicating with his grandparent. Erecting walls between descriptive, historical, and dialectological pursuits has proved a cure worse than the disease. Aside from the untoward effects on linguistic description, there has been an unfortunate trichotomization of the discipline into pursuits which have been theoretically more or less isolated from one another, while logic and the study of the use of language have been deleteriously excluded altogether. Bloomfieldian behaviorism went further and excluded the study of presupposition and force (or intention) from syntax.

Since Saussure's view of synchronic analysis led him to refer to that pursuit as static linguistics, this term will be retained in what follows. But dynamic linguistics will be preferred to his term for the pursuit of diachronic analysis--evolutive linguistics. To quote Saussure:

> It is therefore an [inner] necessity that compels us to split up linguistics into two parts, each having its own principle. [1962:115 = 1959:79]
>
> The opposition between the two viewpoints--synchronic and diachronic--is absolute and allows of no compromise. [1962:119 = 1959:83]
>
> ...diachronic facts quite obviously have no relationship to the static fact that they have produced; they are of a different order. [1962:120 = 1959:83]
>
> So a diachronic fact is an event that has its raison d'être in itself: the particular synchronic results that may devolve from it are entirely separate from it. [1962:121 = 1959:84]
>
> This essential difference between successive terms and co-existent terms, between

> partial facts and facts affecting the system, precludes making [both] the ones and the others the matter of a single science. [1962:124 = 1959:87]
>
> ...despite certain contrary appearances, diachronic events always have an accidental and particular character. [1962:131 = 1959:93]
>
> The radical antinomy between dynamic [évolutif] and static fact has the result that all the notions relating to the one or the other are equally irreducible to one another...So it is that the synchronic 'phenomenon' has nothing in common with the diachronic...the one is a relation among simultaneous elements; the other, the substitution of one element for another in time--a [metalinguistic?] event. [1962:129 = 1959:91]

The thought world of his time forced Saussure into thinking of change as a succession of states.[16] His view that only states matter presupposes a contrariety between descriptive science and time. Since Saussure's death, new outlooks have made the absence of a relationship between past cause and present result anything but the obvious thing it seemed to that scholar. Even on such terms, ignoring historicism and the work of Einstein, how can linguists overlook the manner in which language-users competently communicate across temporally caused differences? It was already obvious to Schuchardt in 1885 that "the old and the new appear distributed within a dialect, however, not only according to age, but also according to sex, education, temper--in short, in most diverse ways" (M-15). Indeed, this is the basis for saying that "every stage of a language is a transitional stage, each as normal as any other..." (M-18). Schuchardt also refers to Karl Brugmann's assumption that mother and daughter forms could exist side by side not only in a given dialect, but even within one and the same individual. If what was obvious to Schuchardt eighty-five years ago is even more palpable today, there should be no doubt that a Newtonian or non-temporal linguistic framework is as inadequate for linguistics as pre-Einsteinian frameworks are for physics. So, however much one may

fault the Neo-Grammarians for their view of change and for their family-tree model, one must acknowledge that they worked within a temporal framework.

Occasional dissent from the Saussurian dichotomy between static and dynamic linguistics was lost in the prevailing climate, sometimes because appropriate models for implementing a different theory were not provided by the dissenters, sometimes because of failures to motivate other points of view with adequate justification on the metatheoretical level against Saussurianism, and sometimes because of simple misunderstandings. In his Oslo Report, Jakobson (1958) denied that 'statics' and synchrony coincide in linguistics any more than in physics. Jakobson (24) phrased the matter as follows:

> Permanence, statics in time, becomes a pertinent problem of diachronic linguistics, while dynamics, the interplay of subcodes within the whole of a language, grows into a crucial question of linguistic synchrony.

Jakobson's ideas on these topics had more influence on his followers in the social sciences than on linguists. Linguistics did not develop the necessary models for carrying out analysis within a dynamic framework within the decade following Jacobson's statement. Despite interesting suggestions, the situation in linguistics up to a couple of years ago had been accurately described in the following words of LePage (1966:vi-vii):

> It is now being recognized that this division [sc. between synchronic and diachronic studies] helps to falsify the picture. The descriptive analysis of an idiolect at any given moment may reveal a great many overlapping systems, some of which are coming to the end of a period of change, others just beginning. The descriptive analyst freezes for a moment what is in fact a highly dynamic system, and describes it in static terms. The 'quantum mechanics' era in linguistics has not yet arrived, but I believe that the study of Creole languages will help it forward....
>
> Many of the world's languages have probably undergone some degree of creolization at

> one time or another; by studying what is happening under our noses at the present day we should get a much better idea of what has happened...in the past. Until we have evolved descriptive techniques somewhat analogous to those of quantum mechanics, however, the best we can do is to describe the two ends of the linguistic spectrum... and give some indication of the continuum in between.

The aim of the present undertaking is to show that LePage's words are no longer true, that the future framework he envisioned in 1966 is in fact now being realized.

In the vast community of all who communicate fluently and competently with one another in English, changes will be more advanced among younger speakers than among older ones. Men lag almost a generation behind women of the same sociological description in some instances (Labov 1972b:118). Changes beginning in informal styles and in the lower classes will reach the upper class formal style much later, etc.

Describing the competence of such speakers in formulations representing the internalized grammars which generate all the differences with which they deal competently is impossible with static models. The artificially idealized data which they handle represent but fragments of language-users' competence, which is distorted when forced into such procrustean moulds. At the very least (Labov 1972), we must attribute to language-users an internalized comparative method.

Saussure himself admitted (1962:113 = 1959:78) that "if time is excluded, the reality of language is not complete...". Unlike Chomsky, he realized that his methodological simplification was something of a distortion. This makes even more perplexing his contention that the synchronic viewpoint is the only reality for the community of speakers. Indeed, Saussure himself had the insight at one point to state the temporal paradox (1962:113 = 1959:78) as follows:

> If you took langue in time, apart from the mass of speakers--suppose an isolated individual living through several centuries--you would

> perhaps not establish any change; time would produce no result in it. Conversely, if you considered the mass of speakers apart from time, you would not see the effect of the social forces that operate on langue.

It was the fear of time that led to antipathy toward processes in structuralism, and eventually to a baffling preference for lists of allomorphs over generalized rules for morphophonic relationships. While operating fully within the static framework, Chomsky & Halle (331) at least admit that the notion of instantaneous acquisition of language by children is a counterfactual simplification.[16] Now that dynamic models which were not available to them in the sixties have become available, their statement that a non-instantaneous model of acquisition would be too complex is no longer relevant. In more general terms, it is worth stressing that there is no reason whatever to suppose that simplified static models would ever prove adequate for the real-life situation in which language is used, although, on the other hand, a more complex time-based theory would work as well for the imaginary desert-island situation as for the real-life one.

Static models are also inadequate for dealing with diachronic linguistics. Some transformationalists (e.g. Kiparsky MS) have sought to bring unity into their work by testing synchronic models with attested historical changes, although there is still a reluctance to allow performance to influence competence (notwithstanding the admission that one purpose of transformations is to make abstract underlying representations performable).[17] And yet the gradual (variable) initiation of changes, well-documented (e.g. Labov 1966) among variationists, has generally not been incorporated into the transformationalists' overall theory of change.[18] The doctrine that grammars are monolectal is seen within the perspective of the gradual initiation of change to contradict the doctrine that linguistic changes are changes of rules, i.e. of significant linguistic generalizations. (See Kiparsky 1971, which provides a popular summary of more technical writings by Halle, Paul Postal, and himself.) This can be shown with a simple example.

In the Western States, the sound which is [ɔ] in many other varieties of English began to be heard as [ɑ], first in paroxytones like naughty, where an apical followed the nucleus; then in oxytones like caught and dawn, where an apical also follows the nucleus; and finally, speakers are now introducing [ɑ] (or failing to change underlying /ɔ/ to [ɔ]) before velars, as in hawk. The result of the changes is to make the words cited sound like notty, cot, don, and hock, respectively. Younger speakers are of course more advanced in the change than older speakers. We may further assume, on the basis of what is known of other examples of change, that the oldest speakers have [ɑ] in the oldest environment, an alternation between formal [ɔ] and allegro [ɑ] in the next-oldest environment, and only unchanged [ɔ] in the prevelar one; and that the youngest speakers have only [ɑ] in the two oldest environments, but an alternation between formal [ɔ] and allegro [ɑ] in the newest one. A monolectal phonology can show only one of the vowels in single-style grammars; where both vowels appear in a single style, if they should do so, the most that can be shown is an equipollent (unweighted and non-directional) optionality between them. When the new pronunciation of naughty (like notty) is first introduced (borrowed) into a speaker's language, it is not of course a rule generalization, but only a relexification, since the new [ɑ] cannot be 'compared' with older [ɔ] in some other style or in the language of some other group in the speech community without contradicting the premises of the monolectal doctrine. Unless a sizable number of new [ɑ] pronunciations are introduced on the same day, the likelihood of a new generalization's being internalized is vanishingly small. Hence, the two fundamental doctrines of change in transformationalism combine to make change impossible. The paradox is obviated in the polylectal grammars of the variationist framework, since the vector-like models employed there formalize language-users' knowledge both of new and old forms in their own different styles and in the different class and other lects with which they communicate competently.

Note that whatever relations language-users may infer about the variants that they become familiar with will no doubt tell them something (and something that is correct in many instances) about the history of their

language. Given 'natural' effects of natural developments in history, the uniformitarian principle which is accepted in historical sciences like geology should also apply in such instances (Labov 1972b: 101,MS). There will, nevertheless, be differences in historical and descriptive analysis. As noted in Bailey 1972, what may be only exceptions in the latter may prove to be valuable relics in the former.

The effects of current studies of creolization on historical analysis have already been alluded to above and outlined in Bailey 1973a. The prevalence of creolization, especially as an important means of introducing 'unnatural' or 'marked' phenomena into a language system, is becoming more widely recognized.[19] Since creolization may be the only means by which new language systems can arise, it seems more than probable that every system or node in a family tree should have at least two parents. Even so, the family-tree model will have a more doubtful status in future analyses than in former ones.

There is an additional static paradox, but discussion of it will have to be postponed to §4.1.

2 THE NEW FRAMEWORK

2.0 General observations. To review the substance of Bailey 1971, the new framework advocated by the writer has two aspects, corresponding to §§1.1,2 which have just preceded. Its ideological orientation contrasts with the homogeneity doctrine of both positivism and rationalism. My orientation is the traditional and perennial one of conceptualism, which accepts as real and worthy of study both the flux of variation in data (in contrast with Platonism, idealism, and rationalism) and also the reality and suitability for study of abstract relations among data variants (as opposed to positivism and empiricism). The second aspect of the new framework is the dynamic paradigm, which, in contrast with the static paradigm of both structuralism and transformationalism, includes time as a fundamental dimension of all analysis.

To allay any misunderstandings about conceptual bias, it should be stressed that my orientation is not the essentialist conceptualism of western scholasticism, but the vitalist conceptualism of post-Hellenistic scholasticism. The former concentrates on essences and ignores life and function, which the Greek scholasticism emphasizes above all. But all scholastic argumentation involves tightly-knit logical arguments which begin and end in data--empirical data, if the question is an empirical one. It is important to stress this, in order to characterize the position being taken here vis-à-vis the new empiricism cropping up in sociolinguistic and glottometric circles, where scholastic is a term of opprobrium. The acceptance of abstract hypotheses and formalized arguments does not commit me to any acceptance of Platonic views on innate 'knowledge' or the role of intuition as more than a sometimes useful discovery tool. On the other hand, the acceptance of naturalness in linguistics (cf. fn. 7)

does not commit me to the acceptance of statistics as more than a sometimes useful discovery procedure. And if it can be shown that theory is underdetermined by data (as it can), it can also be shown that (inadequate) theories of language exclude from the status of factuality data that are as theoretically important to account for as the data which such theories do accept, and therefore that data cannot be easily overincluded in a theoretical framework.

I do not find it credible or useful to suppose that children can internalize relative quantities as such (cf. also Bickerton 1971), especially where cross products like those found in most treatments of variable rules (cf. Labov 1969) are concerned. Nor do I limit linguistic reality to the measurable. Like probably most linguists, I have been convinced (e.g. by Labov 1966) that relative quantities do exist in language data, are systematic, and can be predicted. Like other variationists, I reject the idea that language-users' demonstrated ability to interpret and produce the statistics is a matter of 'performance' rather than of basic linguistic competence. But I disagree with glottometrists in that it is not the statistics which are acquired, learned, or internalized, but rather a psychologically credible implicational pattern generated by the wave model (§4.1).

Scholasticism at its best maintained a psychosomatic view of man and his nature. Man is not simply the mind endowed with innate knowledge of the last orientation in linguistics, but also a body whose physiological characteristics define the limits of 'naturalness' in language. Man is Aristotle's communal animate being whose 'life' is social. As the object of linguistic study, this conception of man demands the inclusion of the function of language in its social context as an essential part of linguistics. The scholastic balance in these matters is further seen in the balance between what is variable and what is constant (the emphasis of the rationalist orientation): water : fish = air : bird.

Since linguistics, like the sciences, is an æsthetic pursuit for all but its drudges, it must seek to preserve an æsthetic balance as well as a balance of all sides of what is truth. One cannot overstress the dangers of a new and doctrinaire empiricism, possibly striving to emerge in some circles, which would denigrate

explanatory hypotheses as 'thought experiments' and elevate methodology above theory. This will prove no more adequate a remedy for the doctrinaire rationalism just past than that in turn was for the older doctrinaire empiricism.

It should also be said that my position is not that of some 'sociolinguists'--viz. that the study of variation is simply a valuable adjunct to linguistics--but rather that the study of patterned language variation in its communicative life cannot be omitted from linguistic theory and practice without invalidating them. What is proposed below is not so much a new theory as a new framework. This framework will of course transform much that is taken over from generative theory, e.g. the study of sound relationships in phonology will now include the level of interpersonal and interstylistic variation. Models will be provided for implementing the new point of view in terms of concrete analyses, for even good ideas remain barren without these.

2.1 Justification of polylectal grammars. Given the complexity of the data on variation that will be considered, it is incumbent on anyone who would claim that language variation belongs to competence not only to show that language-users do in fact competently deal with variation in the very formulation of their internalized grammars, but also to put forward credible hypotheses concerning how the attested patterns could be acquired by children and stored within the brain (cf. fn. 69). One should eschew theories for which no plausible mode of acquisition and storage can be suggested. Indeed, the patterns of variation in language could well provide psycholinguists with interesting hypotheses concerning the structure of the brain for profitable future investigations. What follows is an account of the nature of children's acquisition of language which is so basic that the writer hopes it will be obvious and non-controversial to the reader.

Two main assumptions are being entertained in the present account: (1) Speaking competence is a relatively small subset of the much vaster competence required for understanding those one competently communicates with; and (2) a child, in an on-going process, is constantly revising his internalized grammar with every new encounter with systematic variation in the speech

of others, and this is done in such a way as to create an underlying grammar which will generate all the variants that he must competently cope with. Let us now consider what happens during the first decade of language-acquisition, say up to the age of twelve, which is the crucial period for acquiring native competence in a language.

Ordinarily, a child is mostly exposed to the speech of females in his earliest years. The child is eventually confronted with the speech of his grandparents, who may all be from other regions. Some of them may be of different social classes from each other and from the child's parents. The child, of course, meets neighbors of different regional backgrounds and may travel to neighboring and distant locales. He will communicate with language-users of different classes at school, delivering papers or mowing lawns, at shops and markets, etc.; even in private schools children meet students from more distant locales in compensation for the lack of a variety of class lects, although school employees may provide these. Since it is known that women are about a generation ahead of men in some changes, the language of one's mother will be different from that of one's father, even if their age and class traits are similar. Each of the interlocutors encountered by a child has a multitude of styles which he or she must competently deal with, and there is whispered speech to cope with also in each instance. The spread of radio and other communicational media in this century has further extended the range of data that the child copes with.

The result is that what the child produces gets more and more restricted to the exemplar of his peers (unless he is isolated from them), while what he has in his understanding competence is constantly being enlarged. That our 'active' vocabularies are only subsets of our 'passive' ones is widely recognized. But such considerations have not deterred educational psychologists from equating competence with language production (during interviews, especially with poor children), nor linguists from trying to exhaust competence by asking, 'Would you say...?' Klima & Bellugi 1966: 183 say: "Sentences the child understands describe the scope of his grammar more accurately than those he produces, just as with the adult"[20] Against Chomsky's

view of the symmetry between productive and understanding competence (cf. Shipley, Smith & Gleitman 1969:337 fn. 8), most linguists today accept the asymmetry of the two. On children's competence, compare again the opinion of Shipley et al. (1969:336-337):

> Our data show that children make discriminations that are not reflected in their speech....Thus a description of the child's spontaneous utterances does not do justice to his linguistic organization. In some fairly clear sense, comprehension seems to precede the production of well-formed sentences....A description of natural speech leaves this implicit system entirely out of account. Therefore, in no sense can recent descriptions of children's speech...be taken as grammars of child language.

The linguist can run around tape-recording every utterance of his informants, but if their competence is greater than what they produce, it follows that such recordings, however thorough, will not exhaust, even remotely, his informants' competence. This does not mean that competence cannot be empirically determined, as the work of Shipley et al. in fact shows.

At this juncture, it may be of service to provide a simple illustration of the reconstructive and comparative method in the acquisition of language by children. There have to be at least three stages: (1) The child relates the pronunciations of words he hears in the mouths of different speakers and internalizes a reconstructed representation from which all of them (aside from what were earlier called performance variations) can be systematically generated in his understanding. (2) He acquires different pronunciations for different styles with respect to many of his underlying representations, thus broadening his production variation. This may coincide with the beginning of (3) the child's learning to relate different forms of morphemes in different contexts. At first perhaps the child learns to distinguish formal [t] from informal [d] in a word like cheater, related

to cheat with [t] only. Eventually this ability will be extended to cope with more complex instances like ignite : ignition.

It will not be doubted that variation is heard by the child in the nucleus of came, game, save, way, rain, laid, cane, etc., and in the slightly shorter one in late, wait, gate, hate, etc. Of course, no two pronunciations of the same word, even by the same speaker, are identical. But children descend from the more general to the less general, e.g. calling all animals doggie before learning to distinguish the different kinds of animals. By whatever method they may use, they identify the common internal representation of all the variants of a word like train uttered by different speakers with whom they come into contact; and presumably they learn to identify the nucleus in this word with the one in came, game, save, etc., and even with the one in late, wait, gate, etc. It could hardly be open to question that the underlying representation of their internalized grammars is eventually revised to handle different pronunciations of the nucleus which are more or less diphthongized in different environments, in which the peak will be closer or opener or more or less retracted, etc. Other nuclei in English exhibit even greater variety than the one chosen here for illustrative purposes, which is relatively stable. The talents displayed in these efforts are gradually extended to handle morphophonic variants like sane : sanity when the child progresses to the stage that he must cope with these.

Chomskian linguists obliquely grant that the faculté de langage includes the ability to employ the method of internal reconstruction in creating underlying representations like those of sane and sanity, at least on the synchronic level. If we accept some kind of naturalness condition that requires rules to be of the sort that could evolve in real historical change, then we must conclude that children have within them the ability to 'reconstruct' history in some sense (cf. Chafe 1970:7). For the dimension of history is spread out synchronically on the other dimension of lectal differentiation, just as a beam of white light which has passed through a prism spreads out in a rainbow on a surface perpendicular to the beam. Given the possible restructurings, generalizations, and the like which can

change the structures of past times to different ones later on, the reconstructions of the child will not exactly coincide with those the linguist reconstructs with the help of earlier records. The child who has never heard the Irish pronunciations of mean and meant will hardly assign these and similar words the same underlying vowel that he assigns to break : breakfast and retain : retention. But, just as the historical linguist can reconstruct a parent tongue from the residue in either a few unleveled[21] scions or a larger number of leveled ones, so the child can asymptotically approach a panlectal competence in his language and a grammar that resembles the same one that other users of the language are also asymptotically approaching from somewhat different data, or at least data encountered in a somewhat different sequence. The ability of language-users to do this argues for their possession of the 'comparative method'. So far from agreeing with Kiparsky (1971:310) that "the child is the synchronic linguist par excellence", I would say: "The child is the comparatist par excellence!"

What distinguishes the view of language being presented here from static, homogeneous views of language is that the goal of acquiring a language to communicate is taken seriously and treated as the fundamental consideration in trying to understand language. The account just given clearly accepts the requirement of justifying grammars on the basis of what is psychologically plausible or provable.[22] Without this constraint, of course, there would be no bounds to combining the most diverse data into a single, supposedly unified, putative 'system'. The grammar envisioned in these pages is not located in some reified 'communal mind', socially real though the grammar is claimed to be. And it certainly does not presuppose two competences, one for speaking and one for understanding, despite some asymmetry between the subset and the overall set. The naturalness criterion provides further constraints (which are quite strong) on the kinds of formulations that are tolerated.

It should be obvious that a polylectal grammar can be a psychologically real one, even though no single language-user has all of it internalized, if every pair of adjacent subsystems which are attested are unified in some language-user's internalized competence. In

such a case, there is no risk in positing that the whole grammar is potentially internalizable for a given language-user exposed to all the subsystems of the language.

Until now, the discussion has omitted an additional factor relating to competence, viz. literacy. That literacy greatly affects competence and one's underlying representations can scarcely be doubted, despite all the insistence by modern linguists on the spoken form of a language, but psycholinguists have been negligent in providing linguists with an adequate account of these effects. Speakers who do not hesitate to pronounce Einstinian (the adjective for Einstine) with [ɪ] in the second syllable balk at Einsteinian, pronouncing it now with[a(ᵉ)], now with [ɪ]. When I first heard ['graᵉsɪən], I thought the adjective referred to the name Greis, not Grice. And despite exceptions (which one may or may not be able to account for, [ŋ] seems to be more frequent for underlying //n// before orthographic 'k' and 'g' than before 'c' or 'q' (as in Bancroft, Hancock, and banquet; contrast Bankok and Bengali).

Since Decamp 1971 (delivered in 1968), Bailey 1972 (delivered in 1969), and Elliott, Legum, & Thompson 1969, it has become increasingly obvious that a great deal of linguistic variation patterns in an implicational manner, i.e. item d implies c, which implies b, which in turn implies a. This is true both of different kinds of linguistic phenomena and of different rules, as has been shown (cf. Bailey 1973b); it is inescapable for the suboutputs of variable rules, as will be shown later in connection with the wave model. And even though language-users may greatly differ in their intuitive ratings of the acceptability of different examples, they will generally agree in the relative acceptability of the examples.

Insofar as lects differ in terms of phenomena which can be placed on an implicational scale, they can be uniquely designated by the point at which they occur on such scales. The phenomenon whose presence or absence characterizes them implies the presence or absence of other phenomena lower on the scale and is implied by, but does not imply, phenomena located higher up on the scale. On-going work indicates that the different phonologies of English can be uniquely

designated in this manner. If future work continues to corroborate the surmise that all varieties of English can be designated in terms of a larger overall scale including semantic and syntactic as well as phonological materials, then linguistics will have a practical concept which will prove far more serviceable than dialect.[23] On the other hand, if sets of rules operate in blocs vis-à-vis the rest of the rules in an implicational scaling, as suggested in Bailey 1972, perhaps forming separate branches on an implicational scaling, then the concept of a dialect may be amenable to being rehabilitated, though on entirely new terms. To the extent that implicational patterning obtains among the lects of a language system, the polylectal system can be formulated so as to include all the phenomena of the system. The implicational ordering of the rules will indicate which lects have which phenomena, while lexical features designating the lects (implicationally) will have to handle the listings of the lexicon. Rules will have to be formulated in the least general form in which they are found anywhere in the language system (Bailey 1972), the formulation will employ the most marked feature weighting found anywhere in the system, and whatever marked orders are found in the system will appear in the overall grammar. Other patterns in the system due to more general rules or to less marked weightings of features or orderings of rules will be generated with the principles in later sections. These will specify how waves spread through the system and which feature in a rule will reweight or be deleted to make the rule more general. They will also deal with the hierarchy of markedness,[24] the hierarchy of unmarked feature weightings and the rules or conventions[25] that unmark features.

2.2 Pragmatic competence. That the knowledge of how to use one's grammar should be considered part and parcel of one's linguistic competence, rather than performance, has been proclaimed for a decade by Dell Hymes (cf. 1962) and other scholars of language in the social disciplines. The idea ran too much counter to the prevailing ethos in linguistics, however, and for many years fell mostly on deaf ears. But pioneering work represented by Gordon and G. Lakoff 1971 and R. Lakoff 1972 made it clear that competence in the use of language in social

situations has direct and perceptible effects on grammars. The leadership of these scholars and their colleagues has effected a reversal in the prevailing attitude toward what Charles Morris (1946:219) called pragmatics, viz. "that portion of semiotic which deals with the origin, uses, and effects of signs within the behavior in which they occur". Hymes' term for an equally broad area of study, which extends beyond the purely verbal, is the ethnography of communication. Those who limit attention to verbal language may wish to think of formal grammatical competence and pragmatic or functional competence as subsets of communicative competence. Formal competence refers to the substance of the grammar;[26] pragmatic competence, to the life and use of the grammar. Today there is no need to refer studies of the function of the grammar to Saussure's 'external linguistics', to studies of performance, and the like. Just as semantics has recently become the chief concern of current linguistic research of the highest degree of sophistication, it is only the natural consequence of this concern to formulate the relationship between presupposition and intention with syntactic form. Bloomfield himself (1933:141-2) was aware of the connection when he observed that a beggar and a child resisting an early bedtime mean quite different things when they say, "I'm hungry". But his approach to meaning left such observations sterile. The orientational changes effected by Chomsky created a climate for studies of such questions, but the relegation of the status and other aspects of the social contexts of conversations to performance, together with the concentration on sentence grammar, prevented the burgeoning of such studies until recently. Karttunen 1968 can now be seen as a break with the prevailing orientation.

If empiricism concentrates on the matter, and rationalism on the form, of data, conceptualism (at least of the variety espoused here) focuses on the life and functioning of its object of study. The words of R. Lakoff (922) are quite at home in such a framework:

> ...we cannot stop our analysis at the point of superficial structure, or at the point of logical structure, in fact: we must ask in every case what the extralinguistic

> context of a sentence is, what purpose it is used for; only on that basis can we establish whether or not sentences in two languages are parallel.

In contrast with old-line linguists who still maintain that social context is not relevant to 'grammar', it is notable that Hoenigswald (1966) some time ago was suggesting a variety of topics which belong to a language-user's knowledge of his language. Besides knowledge of conventional orthographies among the literate, he mentioned cultural suppositions about language itself, knowledge or beliefs about the analysis of language, and a folk vocabulary referring to speech activity. The use of puns, obscenities, and the like differs vastly from culture to culture, as does the role of silence in conversation and the veneration of rhetoric and poetry. Hoenigswald mentions differing attitudes toward interpreters' skills, the study of when and how corrections are performed on children, and attitudes toward stuttering and muteness.

The advocates of the new framework consider the study of the use of language an idea whose time has now come. This became very evident at the First Annual Colloquium on New Ways of Analyzing Variation in English at Georgetown University in October, 1972, and at the Conference on Performances, Conversational Implicature, and Presuppositions at the University of Texas in March, 1973.

2.3 Paradigm characteristics and contrasts. While there exist differences among those working in the new framework, there are a number of more or less novel assumptions being accepted by various linguists today which it may be helpful to list here.[27]

1. The introduction of directional vectors into linguistic descriptions was proposed as long ago as 1949 by Fries and Pike (see the quotation in §3.0); and later Labov (1966:10) envisioned grammars showing directionality and rate.[28] The following sections claim to offer models for implementing such suggestions. The models are dynamic or time-based and suitable for either historical or descriptive analysis. They therefore qualify as models for a view of linguistic analysis in

which historical, descriptive, and variational analysis are integrated. They presuppose that the function of time in defining synchronic language patterns cannot be ignored in valid descriptions of language.

2. Although virtually every writer since Hermann Paul except Saussure (1962:281,288 = 1959:205,210) has correlated diversification of language with a reduction in contact density and homogenization with an increase in density, Labov's more informed view (quoted in §1.1) is now accepted. Fishman's (1971:70) recent summarization of what has been learned on the matter concludes that "both uniformation and differentiation are found to go on simultaneously...".

3. The sufficiency of idiolectal data for systematic analysis is not accepted; rather the grammar that represents what speakers know about their language includes both all that they deal competently with in understanding the language of others and their ability to vary the use of their grammar in different social contexts. A grammar of production competence and limited to sentences is but a subset of language-users' overall knowledge of their language, which includes what speakers intend when they utter a sentence in an actual discourse. The goal of the new work is to formulate psychologically valid polylectal grammars of language systems.

4. One of Labov's most important contributions to the data side of linguistic research has been ascertaining that unmonitored speech is vastly more systematic than monitored speech (Labov 1972b:112). The commutation or minimal-pair test has been shown in some instances to falsify the facts of competence (see Labov 1972b:101 fn. 3, 103). It of course goes against the grain of long-standing (Fries & Pike 1949:35-6) assumptions to say that speakers are not consciously aware of distinctions consistently made by them, or that speakers lose these in monitored production, but such is the case. The intuitive source of data which has dominated the last orientation is obviously no longer to be regarded per se as a reliable or valid source.

5. Linguistic changes begin variably in relatively restricted environments, being later extended--at first variably--to more general environments if the vitality of the rule continues long enough, and eventually becoming categorical in all the environments where vari-

able.[29] Three stages are described in Weinreich et al. (184): (1) a speaker learns an alternative form; (2) old and new forms exist side by side within his competence; and (3) the older form becomes obsolete. Because most rules have long existed in any language except a recent ex-pidgin, they will have had time to become categorical (i.e. non-variable). Consequently, few of the rules in a language will be variable at any given time. Variable rules usually have sociolinguistic significance for reasons that will become clear later.

6. A description of polylectal competence presupposes internal reconstruction and some comparative method. Given natural rules and natural modifications of them, it should not surprise the descriptivist if his polylectal formulation bears strong resemblances to historical developments which in fact took place. He will not be able to use information from the past, however available to the philologist, when it is not available to an illiterate child acquiring his or her language; and he will have to treat as pure exceptions relic relationships like that exhibited in draw : dray : drag : draft.

7. The prevalence of creolization in the creation of new systems (nodes in a genealogical tree) makes vines more likely candidates as models of intersystem relations. In short, creoles and the utility of the wave model make family trees obsolete. While there are some parallels between mixing of the sybsystems of a system and the mixing of different systems--both result in neutralizations--much further study is necessary to determine how the two kinds of mixing differ. There is every reason to believe that mixing of subsystems will not destroy the character (e.g. the implicational relations) of the overall system to any large extent, while mixing systems creates new systems. The new framework demands that the omnipresence of on-going change be built into linguistic descriptions. In addition to the usual ways in which subsystems are differentiated within a system--the natural developments of rule generalization, feature reweighting, and changes from marked to unmarked rule ordering--there is the additional process occurring in Swahili. After Swahili, itself a creole (like probably all languages, and certainly English),[30] was further creolized with different

forms of Bantu as it spread away from the coast to inland villages, these local creoles began to decreolize[31] in the direction of coastal Swahili, creating new lects within the system of Swahili.

The following tabulation of contrasts between the static (whether structuralist or transformationalist in orientation) and dynamic paradigms is added here to help pinpoint the differences which justify speaking of a new paradigm:

Static Paradigm:	Dynamic Paradigm:
1. Variation other than morphophonic variation is to be relegated to the category of performance and excluded from the work of the descriptivist.	1. If variation above the level of systematic phonetics is structured and can reliably be attributed to what language-users know about their language, it must be formulated in an adequate grammar.
2. Creole situations are freak situations; creoles are necessarily unstable and rapidly changing.	2. Creolization is normal; all languages have probably once been creoles.
3. Homogeneity is a necessary and useful fiction that will not vitiate linguistic theory or analysis.	3. Homogeneity would be dysfunctional in language; sweeping variation under the rug is deleterious to theory and analysis.
4. Relations among different grammars can be adequately portrayed with the family tree model.	4. A wave model is required for explaining the patterns of variation in language data.
5. Equipollent optional rules are sufficient to handle all the variation that needs to be described in grammars that claim to represent language-users' competence.	5. Rules generating implicationally arranged outputs are required to provide an adequate account of language-users' competence.

6. Descriptions of language should be instantaneous and exclude temporal correlations.	6. Directionality and relative rate of change can and should be incorporated into the descriptive apparatus of grammars.
7. Idiolects are more systematic than higher abstractions; commutation tests adequately reflect language-users' knowledge of their language.	7. Idiolects are not systematic; unmonitored production is more systematic than monitored production.
8. Understanding and production are symmetrical.	8. Understanding and production are not symmetrical. (But cf. fn. 20.)
9. The Saussurian paradox: competence is looked for exclusively in the individual, but variety is sought in society.	9. Competence is polylectal; what language-users know about communicating with others more nearly represents their language competence than the subset of this knowledge exhibited in production.
10. Intelligibility among different varieties of a language depends on good guessing, which is in turn based on similarities.	10. Intelligibility among different lects is predicated either on their tautosystematicity or, in the case of decreolizing gradatums, on one's internalization of the algorithms according to which related systems are mixed.

3 DIRECTIONALITY AND RATE IN VARIATION

3.0 Directionality and markedness. While restructurings can and sometimes do occur, it remains true that the patterns of a language are the cumulative result of natural, unidirectional changes, which begin variably and spread across the social barriers of age, sex, class, space, and the like in waves. Such is the thesis of the present writing. It is time that differentiates the patterns found at different points in social space closer to or more remote from the origin of a change. Since however the relative rate among different aspects of a change may affect the resulting pattern, descriptive rules must have rate factors as well as directionality built into them. Such rate factors must be able to handle the acceleration of later changes ahead of earlier ones.

What is new in the present undertaking is not the idea, but the models, and even these are mostly adaptations of Labov 1969, with the exception of the general principles in §3.2 and §4.1. Fries & Pike (1949:42) advocated the incorporation of directionality into linguistic description more than two decades ago:

> It is impossible to give a purely synchronic description of a complex mixed system, at one point of time, which shows the pertinent facts of that system; direction of change is a pertinent characteristic of the system and must also be known if one wishes to have a complete description of the language as it is structurally constituted.

The prevailing assumptions of the static paradigm obstructed the hope of realizing descriptions of the sort that were needed.

Even the revival of interest in marking theory among

the transformationalists led merely to a more subtle evaluation metric. They did not replace static plusses and minuses in rules with dynamic markings,[32] whose proneness to change endows them with directionality in accordance with this fundamental premise of the new paradigm:

(1a) The directionality of natural change is from what is more marked to what is less marked;

(1b) when two changes conflict, unmarking on a higher hierarchical level may overrule a lower-level feature-marking produced by the higher-level unmarking.

A few comments on several aspects of this principle are in order. The first is that only natural changes are concerned; see fn. 19 for other developments. The main [x natural] source of marked values is borrowing. The borrower of a linguistic rule, at least if from another language system, usually acquires a more general form of the rule, as a result of missing one of its features (cf. children). Secondly, the changes specified by the principle do not have to occur. The principle indicates a proclivity, a directionality of change <u>if</u> it should occur, not a necessity that things must change. The need to keep words apart in communication may often obstruct natural changes, especially those that yield neutralizations, and prevent their occurring. Finally, the manner in which higher-level unmarkings (cf. fn. 24) can produce lower-level marked values of features can be illustrated with two kinds of examples. Assimilation often produces marked neutralizations, nasal vowels in the environment of a nasal consonant and intervocalic lenited (voiced and continuant) obstruents. Another example comes from the reweighting of features to their unmarked weights (see the Appendix), since a heavier-weighted feature may unmark at the expense of marking a lighter-weighted one. A simple example is the change of <u>u</u> to <u>ü</u>, where heavier-weighted [grave] changes from a marked to an unmarked value, and lighter-weighted [rounded] changes from an unmarked to a marked value. The role of the formalism is important,[33] and an adequate formalism would make it impossible to formulate unnatural changes. (For the change of the vowel <u>u</u> to <u>ɨ</u>

to i, a change formalized as [⊃ grave] with [round] remaining unmarked, see on the implicational coefficient ⊃ below.)

Given the convention of writing heavier-weighted variable features above lighter-weighted ones in the same segment, the change of $\begin{bmatrix}(m\ F_i)\\(u\ F_j)\end{bmatrix}$ to $\begin{bmatrix}(u\ F_i)\\(m\ F_j)\end{bmatrix}$ results in an overall reduction of markedness, since the single m in the output is lighter-weighted than the single m in the input.[34] This is illustrated in the change of u to ü already discussed, and will be further illustrated presently. It should also be noted that the same result can be achieved by a change that simply reweights $\begin{bmatrix}m\ F_j\\u\ F_i\end{bmatrix}$ to the unmarked weighting $\begin{bmatrix}u\ F_i\\m\ F_j\end{bmatrix}$. Where the value of a feature depends on the value of that feature in an adjacent segment, the value in the segment where it is dependently defined seems to have unmarking priority over the segment in which it is independently defined in cases where both are marked. This can be illustrated with [continuant], where [= cnt] (not-minus continuant) is more usual or unmarked than [+ cnt] in the special position in the syllable following the nucleus.[35] The expected or unmarked value of [continuant] in the next segment (which is not in a special position) will be minus if the preceding is not minus, but plus if the preceding is minus. Therefore, ft and xt following a tautosyllabic nucleus have a [u cnt] t, where [continuant] is contingently defined. The change from fþ to ft in Old English and some current lects is found in fift(h); cf. sixt(h). This change reduces the markedness of [continuant] in the segment where it is contingently defined. A change of fþ to pt would increase the markedness of [continuant] in the segment where it is independently defined, but does not occur. The change of pt and kt to ft and xt reduces the markedness of the feature in both segments and is well-known; cf. PIE *septḿ 'seven' and *oḱtṓ 'eight' with modern Greek eftá and októ and with German acht. The change of pt, kt to fþ, xþ, which would reduce the markedness of [continuant] only in the segment in which it is independently defined, does not seem to occur. But the feature may be unmarked where contingently defined at the cost of increasing its

markedness where independently defined, as in the change of Old English wæfs to wæps (see below for later Old English wæsp) 'wasp', from PIE *webhsā.

A more complicated example can now be discussed, viz. the change of sk to ks (in the derivation of Old English āxian from āscian 'ask' or of late West Saxon English fixas from fiscas 'fishes'), in contrast with the apparently opposite kind of change seen in the change of wæfs or wæps to wæsp, modern English wasp. Since [lingual] is less marked for k than p in the special position, but elsewhere [lingual] is more marked for p than for k, we might expect some explanation for the different directionality of the changes to be found in this difference. The Appendix shows that the values of the features which differentiate [s], [p], and [k] are as follows in the special position:

[s]: [m cnt, m liq, u sul, u grv, m lng]
[k]: [M cnt, M liq, M sul, u grv, u lng]
[p]: [M cnt, M liq, M sul, u grv, m lng]

Elsewhere these values are all unmarked for [s], though in the case of [continuant], this is only true when a preceding postnuclear segment (or a following prenuclear one) is [- cnt], as in the cluster being considered here. And [k] and [p] are marked as follows in the position following an immediately postnuclear segment:

[k]: [u cnt, u liq, u sul, m grv, M lng]
[p]: [u cnt, u liq, u sul, m grv, m lng]

A calculation of the change of ps to sp in wasp results in about the same amount of markedness in the output as in the input, if all features were equally valued; but the increase in the lighter features is offset by a decrease in the heavier ones, which is therefore greater than the increase. In the change of sk to ks, what reduction of markedness occurs is found in the lighter-weighted features (assuming the same relative weightings as before), but is more than the increase in marking in the heavier-weighted features. On the other hand, a putative change of ks to sk would represent a large increase in markedness and would not be expected. The change of sp to ps would similarly be unexpected because it would involve at least as great an increase of marking as decrease, and the increase would be in the heavier, not the lighter, features. If this change

is found, it will be necessary to assume a different, presumably marked, weighting of the feature values.

The widely attested change of tk and tp to kt and pt, respectively, is an unmarking of [grave] in both segments. The further change of kt, pt to tt (e.g. Italian fatto, rotto) is an assimilatory change; see Principle 1b above. The simplification to Spanish roto is a feature-unmarking. What of the opposite changes of x to f and f to x in many languages? It is easy to assume that x would become f before a nucleus and that f would become x following a tautosyllabic nucleus, if their values of [lingual] correspond to those of k and p. A crazy rule (cf. Bach and Harms 1972) could then generalize the new segment to other environments (see further fn. 38). Similarly, the change of apical [r] to uvular [R] must have naturally begun in an environment with lowered uvula (it seems to begin, in fact, in languages having nasalized vowels) and been generalized to other environments. Of course, the change may occur in a different manner, namely through the borrowing of [R], but this is a relexification, not a new rule. For while the development of [R] beside a nasalized vowel is natural according to Principle 1b, the natural denasalization of the vowel leaves [R] henceforth without a rationale. But now it is merely a lexical entry, rather than the result of some 'unnatural' rule in the language.

It has been seen that opposite changes can be explained without abandoning Principle 1a by invoking feature-reweighting, the special position, and crazy-rule generalization, as well as other items involved in Principle 1b (under which are included the implicational feature coefficients $\supset$ and $\subset$ discussed below, which specify chain shifts; for others, see fn. 24). Other ways for being true to data involving opposite changes can be handled by distinguishing morphological or morphophonic rules from phonological rules. Thus, ablaut (though in pre-Indo-European doubtless a phonological relationship) is morphological in English, while the vowel shift is phonological, and some metatheses are morphological, while many are phonological. The phenomenon of rule-inversion (Vennemann MS) appears to be amenable to this distinction. Another kind of opposite changes or rules can of course be handled by the phenomenon of rule-inhibition, which is discussed elsewhere;

thus, an apparent unnatural change of $\underline{a^e}$ to $\underline{e^i}$ is due to the inhibition of the natural change of $\underline{e^i}$ to $\underline{a^e}$. Yet another variety of opposite changes involves the change of an unglided vowel to a rising or falling diphthongal nucleus and the converse. These phenomena seem to be related to the interdependence of prosodic phenomena discussed in fn. 24. Thus a shift in syllabication--due, e.g. to anaptyxis, vowel epenthesis, syncope, or apocope--may result in a preference for a different type of diphthong (rising or falling) or undiphthongized nucleus. A falling diphthong is undesirable in a language that prefers unmarked syllabication (open syllables). Further, a rising diphthong may become a pure vowel when the palatal or labiovelar glide at its beginning is absorbed into the preceding consonant as a palatalization or rounding feature.

Linguistic analyses using marking feature coefficients instead of static plusses and minuses have directional change built into them. As for the natural basis of unmarking and rule-generalization, it is to be looked for in the acquisition of language by children. Generalization is obvious: children perceive more generally at first and only later with greater specificity. Missing a feature makes a rule more general. Assuming a correlation between markedness and relative difficulty of acquiring, we may assume that when children fail to acquire a marked aspect of adult language, perhaps because the language has (through borrowing by adults or some other cause) exceeded the threshold of their ability to acquire markings, they simply end up with the unmarked equivalent.[36] Their failure to acquire a given mark results in a diachronic change of marked to unmarked, which is only apparently paradoxical in the light of children's own acquisitional progress from unmarked to marked. It must be assumed that children in some sense 'know' the directionality of change, or at least of such changes as are 'natural', i.e. due to the manner in which children acquire languages. The directionality of other changes[37] due to borrowing and hypercorrection must be assessed with the help of relative quantities and Principle 20 (pg. 92). It will be made clear later that the child must know what classes prefer or shun a new phenomenon, i.e. what the value of the social feature [favored] is for it.

For some changes, this awareness may be postponed until the late teens.

In view of the differing concepts of marking and naturalness that abound today, it may be useful to interpose here a few comments on the different positions, all of which derive from Jakobson 1968 (first published 1941). Aside from the views of Jakobsonians and Pragueans quite outside the generative tradition, those known to the writer either share the generativist point of view of Chomsky & Halle 1968 (e.g. Postal 1968, Schane 1968, and Cairns 1969, 1970) at one end of the spectrum or are associated with a point of view not very different from the 'natural phonology' proposed by David Stampe (cf. Stampe MS). Nearer to the former pole, but distinct from the point of view that prevails there, are the views of Schachter 1969 and Vennemann 1972; nearer to the other pole are Matthew Chen (see References) and Schane 1972. All of these scholars employ plus and minus values in phonological rules, although several permit marking values in the lexicon. Those closer to the outlook of generative phonology utilize marking values to determine unique (non-arbitrary) underlying representations of neutralized feature values, as a metric or interpretative tool to adjudge the naturalness of rules, and to trigger what is known as linking (Chomsky & Halle 419-35; see criticism in Bach & Harms 1972).

Besides using ternary-valued features and marking coefficients of features in phonological rules, the position taken here differs from others chiefly in the distinction between the two levels represented by Principle 1a (feature-unmarking) and 1b (higher-level natural rules) and in making use of the special position in the syllable (cf. fn. 35) in differentiating the making values of several features. Stampe, like the generativists, makes no distinction between feature-unmarking and natural rules, although he advocates only the latter, while they maintain only the former. The position taken here utilizes natural rules that both unmark feature values--thus, marking theory is part of the point of view maintained in this study--and perform higher-level simplifications. This point of view has been intimated by Vennemann 1972b:240, whose typological-adjustment rules have correspondences with the writer's

higher-level unmarking rules. (Vennemann's I-rules show how different his position is, however; where changes that increase markedness are not due to borrowing, they can be handled as proposed in the discussion of rules effecting opposite changes which are discussed several paragraphs above.) Like other scholars, the writer admits that the marking values of lighter-weighted features may vary with different values of heavier features, and that marking values of features may differ according to the values of features in adjacent segments (see the discussion of [continuant] above and of [nuclear] in the Appendix). But the present view differs from some in our not having contex-sensitive non-markedness when due to assimilation. Further, the writer's special position goes a good deal beyond what has been accepted by others (except Parker MS, where the present position is anticipated, and--in a limited way--in Chen MSb) and requires treating syllables as basic production units. But it is the distinction between unmarking feature values and higher-level natural rules which is most important in enabling us to explain opposite rules without abandoning (as in Miller 1972) the principle of unidirectionality of natural changes. Without this principle and the dynamic rules which the use of marking values permit us to formulate, the goal of polylectal grammars would be unthinkable.

3.1 Generation of subsystems. The advantages of marking formulations in reconstructing underlying representations for polylectal systems, whether 'synchronic' or 'diachronic', ought not to be overlooked. A principle of internal reconstruction that follows from Principle 1a in the preceding section is Principle 2a; Principle 2b has a similar logic:

(2) It is feasible to formulate a polylectal underlying representation to generate variants that differ

(a) in the value or relative weighting of a feature or in the ordering of a pair of rules, if the pre-unmarked feature value, weighting, or ordering is reconstructed; and

(b) in more and less general forms of rules, if the least general form of the rule--

the one with the greatest number of feature constraints--is reconstructed.

The wording of Principle 2a mentions the 'pre-unmarked' value of a feature instead of the 'marked' value in order to take into account the 'unmarkings' specified by Principle 1b as well as 1a. Principle 2a is valid because what is unmarked can be generated--therefore predicted and presumably more easily understood--from what is marked. But the converse is not possible.[38] Principle 2b depends on the fact that what is more general can be generated from what is less general by simply dropping a feature.[39] Principle 9 below purports to specify that it is the heaviest-weighted variable feature in a rule that gets deleted and the lightest that gets reweighted when such generalizations and reweightings take place. Although what is more general can be predicted from what is less general, it is the more general formulation that implies the less general one in tests like the one in Elliott et al. (Bailey 1973b).

At this point it will be helpful to provide an illustration of reweighting and its formulation in a polylectal grammar. The example is based on data from Labov 1969, 1972, and Labov, Cohen, Robins & Lewis 1968, taken from samples of the speech of male Black speakers in Harlem in New York City. It has to do with the patterns of deleting clustered word-final apical stops in the presence or absence of two variables:

(i) The presence or absence of an internal word boundary[40] between //t// and a preceding obstruent and between //d// and a preceding //n// or lateral (in nonstandard speech, also an obstruent). (The boundary, which is present in miss#ed, bann#ed, bowl#ed, and bill#ed, is absent in mist, band, bold, and build.)

(ii) The presence or absence of a vowel[41] at the beginning of the word that follows immediately, if in the same phonological phrase.

The earlier form of the rule is given informally as 3a below. Here the two variables have their marked relative weights: [word boundary] is heavier than [nuclear]. A reweighting to the opposite, unmarked relative weighting yields rule 3b. The variable features in the rules are indicated by variable features or by parentheses. (Rule 3a will be reformulated in

§3.3 as 3a'.) Table 1 provides a calculus for the four environments--a, b, c, and d of rule 3a according to the principles outlined in the Appendix. Table 2 does the same for environments a, b', c', and d of rule 3b. Note that in calculating environment weightings, minus weights give positive products when multiplied with minus feature coefficients, and negative products when multiplied with plus feature values. The principles discussed in the next section provide that rules operate 'faster' in heavier environments than in lighter ones:[a]

(3a) $\left\{\begin{matrix}d\\t\end{matrix}\right\} \rightarrow \emptyset \;/\; C\ [-2\ w.b.]\ \_\_\ \#\#\ [-1\ nuc]$

(3b) $\left\{\begin{matrix}d\\t\end{matrix}\right\} \rightarrow \emptyset \;/\; C\ [-1\ w.b.]\ \_\_\ \#\#\ [-2\ nuc]$

Table 1. Calculus for rule 3a in the temporally successive environments, a, b, c, and d.

		[-2 w.b.]	[-1 nuc]	Total
Env. a	mist ## [- nuc]	-2 X - = +2	-1 X - = +1	+3
Env. b	mist ## [+ nuc]	-2 X - = +2	-1 X + = -1	+1
Env. c	miss#ed ## [- nuc]	-2 X + = -2	-1 X - = +1	-1
Env. d	miss#ed ## [+ nuc]	-2 X + = -2	-1 X + = -1	-3

Table 2. Calculus for rule 3b in the temporally successive environments, a, b', c', and d.

		[-1 w.b.]	[-2 nuc]	Total
Env. a	mist ## [- nuc]	-1 X - = +1	-2 X - = +2	+3
Env. b'	miss#ed ## [- nuc]	-1 X + = -1	-2 X - = +2	+1
Env. c'	mist ## [+ nuc]	-1 X - = +1	-2 X + = -2	-1
Env. d	miss#ed ## [+ nuc]	-1 X + = -1	-2 X + = -2	-3

Deletion in the heaviest environment is of course normal in both American and British standard pronunciation. (See fn. 41.) Most of the male Blacks investigated by Labov and his associates had rule 3b in casual conversation. But in the style used with an interviewer present, working-class teenagers and adults who had lived mostly in the North had rule 3a. Pre-adolescent boys, as well as adults who had lived in the South in their early years, used rule 3b in the interview style. Isolated pre-adolescents who did not belong to gangs (the lames) and middle-class adult Black males used 3a in the interview style. Thus, the newer (reweighted) form of rule 3 is characteristic of youthfulness and informality or lower educational status.

The comments in the preceding paragraph about the relative recentness of rule 3b assume normal linguistic change. But it is likely that the actual directionality of time is just the reverse for many speakers. This is because the process of decreolizing an original Black Creole involves changes of unmarked to marked by borrowing English marked phenomena in place of creole unmarked phenomena. Since the criteria for directionality of change are reversed in such cases, the result is the same: 3b has the unmarked weightings of the variable features found in rules 3a and 3b. That we may be dealing with natural changes here, rather than decreolization, may possibly be deduced from the fact that the standard English rule (operative rarely in all but the earliest environment) is the 'later' 3b, not the 'earlier' 3a.

Let us now turn to marked and unmarked rule orderings, a subject for which the literature representing new points of view is becoming copious. New views are being represented by Anderson 1969, Kiparsky 1971, and King MS. Koutsoudas, Sanders & Noll MS, Koutsoudas MSa and MSb, Ringen MS, Norman 1972, and Lehmann 1972, as well as Vennemann 1972, claim that there is no extrinsic rule ordering, i.e. that universally valid principles uniquely determine the applicational priority of any two rules, if they have any ordering relationship to each other.[43] The following discussion will show that this assumption is not tenable. Nevertheless, the general principles advocated by Koutsoudas et al. and by Vennemann may well define unmarked rule order, the order to which a marked ordering may give

way in the natural development of a language system. At all events, the result of the work referred to in this paragraph is to take linguistic theory much closer to a position in which no two rules can have both their relative orderings marked or unmarked, but where one ordering will be uniquely unmarked and the other marked.

The examples of reordering which follow are both amenable to the principle of maximizing feeding order first proposed in Kiparsky 1968. (Many more examples are found in Bailey 1973c.) Both of the examples to follow probably began (variably) in allegro pronunciations, when monitoring was minimal and the suppression of unmarking ceased to prevail (cf. fn. 36). The first example is an example of a lexical exception to the prevailing rule order of a single lect, according to principles proposed in Bailey 1968b and later established in Anderson 1969. Both examples show how different lects of the same overall system are differentiated by ordering differences:[44]

1. Rules iii and iv are required for all (non-creolized) varieties of 'r-less' English and are relevant to the intermediate representation of pattern, /'pætɚn/. In the order shown below, iii-iv, they convert this representation to /'pætən/, which is changed by later rules to become the phonetic output of Southern States English: ['phædən]. Since rule iii cannot operate on the representation /'pætɚn/ if not preceded by rule iv, this is the marked order. (Rule iv generates [n̩] in Patton and paten.)

(iii) Unaccented /ɚn/ becomes [n̩] following non-syllable-initial (unclustered and non-word initial) /d t ð θ/ and following /z s/ (also /ž š/ in BRP and in fast tempos of other lects), whether syllable-initial or not.

(iv) The sulcal vowel /ɚ/ (which is found as a syllabic peak only in unaccented syllables) is changed to /ə/ (i.e. it is desulcalized).[45]

But in New England and in the so-called 'received pronunciation' of England, the rules just given have their unmarked ordering, iv-iii, in which both rules operate on the form /pætɚn/. Rule iv first changes this to /pætən/, which is then changed to /pætn̩/ by rule iii, resulting in a merger of the output of pattern with the output of Patton.

But even Southern States English, with its marked order, iii-iv, has exceptions like modern ['mɑdn̩], generated with the unmarked order, iv-iii. Since this variety of English would have the marked order, iii-iv, as the normal order of its grammar, some notation for exceptional lexical items must indicate that rule iv has its unmarked order. It is important to note that this order can be predicted from the marked order. For this reason, the panlectal grammar of English would adopt the marked ordering. Lects having the unmarked ordering for all lexical items on which the rules could operate are simply marked in the grammar and in speakers' minds for an across-the-board reordering.

2. The next example to be considered involves rules v and vi, given here in their marked order:

(v) A lateral not followed by a vowel is changed to become the satellite of a preceding nucleus.[46] (The satellite is written [ɪ̯:]; note the length indicator.)

(vi) Unaccented /ü/ (generated from underlying //u// standing before a weak consonantal cluster followed by an underlying vowel) is changed to /yə/.

The operation of these rules (in the order shown) can be illustrated with Southern States volume ['vɑlyəm 'vɑyəm -əm], value ['vælyə 'væyə -ə], and valiant ['vælyə̃t 'væyə̃t];[47] from underlying //vɑlume vālue vāl+iant//.[48] Rule v cannot operate on these forms unless rule vi has previously created a consonant (viz. /y/) immediately after the //l//. This later, unmarked ordering, in which both rules vi and v operate in turn on the underlying representations of these examples is what in fact generates the Northern States pronunciations: ['vɑɪ̯:yəm -əm 'væɪ̯:yə -ə 'væɪ̯:yə̃t].

The variants just discussed in both of the preceding examples do not differ in their underlying representations, but only in the rule orderings of the lects in question.[49]

It is being taken for granted here that rules are added at the end of the rule component[50] to which they belong (cf. King MS), although simultaneous reordering to an unmarked position higher up is possible. And the writer accepts the view (discussed, e.g. in Anderson 1969) that rules are normally applied in iterative fashion. This is clearly the case with PIE [syllabic],

in harmony languages (like Turkish, where an anharmonic segment interrupts the process), and in generating intonational patterns in English (Bailey MS).

Mention has been made (fn. 36) of unmarking processes which operate in adult speech because of haste, fatigue, or emotional upset, conditions that reduce self-monitoring.[51] Conversely, late rules which unmark even normal informal styles are suspended in more monitored, formal, or over-correct styles; cf. the study of 'Sunday Greek' by Kazazis (1968). The obvious reason for this is that late rules make phonetic outputs more unlike underlying representations (including, for literates, the spelling) than they would be without such late rules. The most monitored pronunciation is employed for disambiguating. If the late rule that changes syllable-final /t/ to [d] intervocalically is suspended, [t] will be heard in mettle and metal (cf. metalic), which are distinct from medal (cf. medallion) and meddle. If 'r-less' speakers suspend their late rule iv (see above), spar (cf. sparring) will be kept distinct from spa.

Rule-inhibition has been misinterpreted by variationists and also by other authorities on rule ordering. To justify the sulcalization of /ə/ or the change of /a^{e} a^{o}/ to /ə^{i} ə^{u}/ would require such an extreme view of rule-inversion that the justification of natural-language rules in terms of historically valid changes would be impossible. Note that Kiparsky 1968, which specifically accepts this principle (and it has not been overthrown in Bach and Harms 1972, once the hierarchy of markings is understood; cf. fn. 24), quite correctly speaks of 'the loss of word-final devoicing in Swiss German and Yiddish' (1968:190). Other generative phonologists have not always been so careful.

If we assume that unmarked rule ordering is simply the absence of ordering (fn. 43), so that an unordered rule may operate repeatedly as an 'anywhere rule', then unmarking the order of a rule will unmark any marked-order relation it has with every other rule, not simply the marked relation between it and one or some of the other rules. This interesting assumption appears to have been corroborated in a rather complex example from Carden's (1970) thesis, which will now be discussed. In his thesis, Carden discovered four isolects differing with respect to the orderings of three rules:

TAG (Tag-Question Formation), QL (Quantifier-Lowering), and NT (Not-Transportation). The lects which Carden had discovered in 1970 were W, X, Y, and Z in Fig. 1;

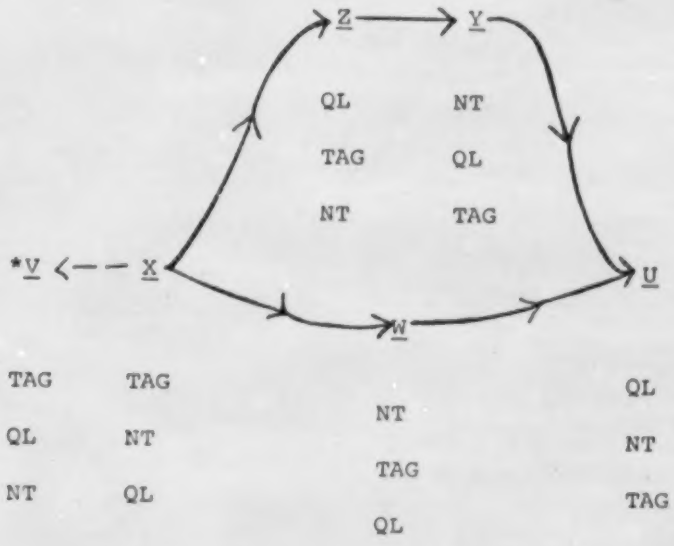


Fig. 1. Succession of Lects Generated from Lect X by Successive Reorderings of a Single Rule to its Maximally Unmarked Order with Respect to Each of the Other Rules. (Arrow heads indicate the directionality of the changes; broken shaft of the arrow pointing to the impossible lect, V, indicates a reordering forbidden by the theory.)

X has all the rules in their mutually marked orderings, orderings from which all the other mathematically possible lects could be derived. Carden predicted that isolects represented by the other two orderings, shown in Fig. 1 as U and V, would also be possible. And he in fact later went looking for them. Bailey 1970 questioned the possibility of lect V, while granting that U, where all the rule orderings are unmarked, would indeed be possible. The reason for ruling out lect V was that it could be generated from X only through a partial reordering, i.e. a reordering of a rule with

respect to only one of the other rules. Subsequent investigations by Carden have provided a large number of instances of U, but none of V.

Despite the impressive apparent corroboration of the view that rules cannot unmark partially, but only in toto, further research (Bailey 1973c:237) suggests that it may require modification. Obviously, further checking is in order.

The writer has for several years been of the opinion that rule-deletion comes about through changes to unmarked order. In Bailey 1973a, it was pointed out that, if the marked order of rules (a) $\underline{y} \rightarrow \underline{z}$ and (b) $\underline{x} \rightarrow \underline{y}$ is unmarked to permit (b) to feed (a), so that $\underline{x} \rightarrow \underline{y} \rightarrow \underline{z}$, a restructuring would occur: Rule (b) would be dropped, and the input to (a) would be generalized as both $\underline{x}$ and $\underline{y}$--or only $\underline{x}$, if $\underline{x}$ should become the sole source of $\underline{y}$, in which event $\underline{y}$ would be eliminated from lexical representations. Such changes would not take place in a polylectal grammar until practically all its subsystems had undergone the reordering in question. Lack of space prevents extended discussion of rule-deletion, which can perhaps be caused by creolization also, but the foregoing will suggest what may be involved.

All such changes take effect gradually, and no doubt items which are eliminated from the language disappear in some implicational sequence.[52] A possible explanation for chain shifts (like the consonant shifts in Armenian and German or the chain palatalizations in Slavic and French, for some discussion of which cf. Dressler 1971) which utilizes an aspect of marking theory was put forward several years ago in Greenberg 1966:95-6. (See also Lass 1971.) While it may be that changes which destroy the expected implicational relationships among items in the inventory of a language demand the restoration of the proper relationship, either by changing the implicans to the implicate or by restoring the implicate in some manner, there are enough problems connected with this view to be cautious about it. However, the reasonableness of this theory warrants a fair testing for it.[53] Changes that result in some sort of additional markedness of an environment or lower-level feature can be tolerated until the language gets too marked for children to be able to acquire it. Once their threhold is exceeded, they will fail to acquire some marks of their native language.

Earlier and later changes and environments of changes can be built into rule formulations with implicational feature coefficients. These are illustrated below with rules of my own proposing and three rules from Chen MSb, where a quite different notation is found. (The notation [! lower] is proposed in Miller 1972:140 to denote "the increasing likelihood" of a rule's operation with respect to a lower vowel.) In the notation proposed here, $\lceil \supset F_i \rceil$ indicates that the plus value of a feature is relevant to the rule before the mid value ($[x\ F_i]$), and that the mid value is relevant prior to the minus value. This temporal sequencing of $[+\ F_i]$ before $\lceil x\ F_i \rceil$ before $\lceil -\ F_i \rceil$ creates the overall implicational patterning in the language, $\lceil -\ F_i \rceil \supset [x\ F_i] \supset \lceil +\ F_i \rceil$. When the value of a feature is $\lceil \subset \rceil$, its minus value is prior to its mid, and that is prior to its plus value. Where an input $\lceil \supset F_i \rceil$ or $\lceil \subset F_i \rceil$ effects a chain shift, one step of which changes an input $\lceil$u low] ([+ low]) vowel to an output [M low] ([x low], or mid) vowel, as in rule 11 below, we see Principle 1b overruling Principle 1a. The same is true of the assimilatory rule 5a below, which changes unmarked values of input features to marked values in the outputs. Of course, an input unmarked feature does not violate Principle 1a if some other feature is the one that is changed in the output, as in rules 4a and 6a. Thus, rule 4a stipulates that like changes affect [- grave], or front, vowels prior to affecting [x grave] (mid-grave or central) vowels; and these before [+grave], or back, vowels.

The illustrative rules that follow show how dynamic formulations are possible and how they permit the linguist to break out of the straitjacket of the static framework.[54] Rules 5a, 5b, and 6a are assimilatory. Since 6b merely reverses 6a, both are combined in rule 7.

(4a) $\begin{bmatrix} V \\ \subset \text{grave} \end{bmatrix} \rightarrow \ldots$

(4b) $\begin{matrix} C \\ \supset \text{voiced} \end{matrix} \rightarrow \ldots$

(5) $\begin{bmatrix} C \\ \supset \text{lingual} \end{bmatrix} \rightarrow \left\{ \begin{matrix} \text{(a)} \begin{bmatrix} \text{u grave} \\ \text{M lingual} \\ \text{m dorsal} \end{bmatrix} / \_\_ \begin{bmatrix} \text{u nuclear} \\ \text{u grave} \\ \subset \text{low} \end{bmatrix} \\ \text{(b)} \begin{bmatrix} \text{M continuant} \\ \text{m voiced} \end{bmatrix} / V \_\_ V \end{matrix} \right\}$

(6a) $\begin{bmatrix} V \\ \subset \text{grave} \\ \supset \text{low} \end{bmatrix} \rightarrow [\text{m nasal}] / \_\_ [\text{u nasal}]$

(6b) $\begin{bmatrix} V \\ \supset \text{grave} \\ \subset \text{low} \end{bmatrix} \rightarrow [\text{u nasal}] / \_\_ [\text{m nasal}]$

(7) $\begin{bmatrix} V \\ \alpha \subset \text{grave} \\ \alpha \supset \text{low} \end{bmatrix} \rightarrow [\text{n nasal}] / \_\_ [\alpha \text{ u nasal}]$

where $-\supset = \subset$, where $-\subset = \supset$, where $-\underline{u} = \underline{m}$ or $\underline{M}$, and where $\underline{n}$ abbreviates $\underline{u}$ in non-assimilatory natural rules, but an assimilatory value (here: plus) in assimilatory rules (cf. Schachter 1969).[5]

Rules 4a, b are really metarules governing other, substantive rules; e.g. 5a, b should include the input feature [⊃ voiced].

Rule 5 changes consonantal inputs in this sequence: first [+ lingual] consonants, or dorsals (in 5a: velars); then [x lingual] consonants, or apicals; and finally, [- lingual] consonants, or labials. The change generated by 5b is lenition, i.e. the change of intervocalic obstruents to voiced continuants. The output feature [M continuant] denotes a fricative only if the segment in question is prenuclear. If it should turn out to be true that such assimilations occur also in syllable-final intervocalic obstruents (as appears to be the case with the rule illustrated in American English beater ['bidə]), the rule will have to be complicated accordingly, but this is not necessary for the present illustration.

Rule 5a palatalizes inputs before front vowels--first, if these front vowels are [- low], i.e. high; next, if they are [x low], i.e. mid; and lastly, if they are [+ low]. For the intersequencing of the nine outputs resulting from the interaction of the two variables in rule 5a, see §3.3.

Rule 6a generates a nasalized vowel before a segment that is unmarked for the feature [nasal]--which in the special position can only be a nasal consonant. The rule stipulates that the change occurs in [+ low] vowels before occurring in [x low] vowels; and that [- low] vowels are the last (and least likely) ones to be affected by the rule. Note also that grave inputs are affected before non-grave inputs, which are less likely to undergo rule 6a. With rule 6b, which denasalizes vowels, everything is reversed. Consequently, 6a and 6b are combined as rule 7. Note that rule 6a agrees with 4a while 6b--if indeed it should mention [⊃ grave] in the input--merely reverses the assimilation of 6a.

Many more natural rules remain to be written. There will be rules specifying the raising of long and close vowels and one specifying the lowering of short and open vowels (but cf. fnn. 60, 73, where certain problems connected with 'tense' and 'lax' vowels are discussed). As already observed, rule 4a should be superimposed on rules 5a and 5b in the manner that rule 4b already has been on 6a in the above formulation. Another rule will provide that vowel-raising changes usually begin in oxytonic syllables before [⊂ grave] consonants, while another will provide that vowel-lowering rules operate first in paroxytonic environments before word boundaries and subsequently before [⊂ lingual] consonants (cf. §4.2), eventually spreading from paroxytonic to oxytonic syllables. The facts surrounding the diphthongization of //ī// (cf. fn. 73) show that rhythmic and incremental length have opposite effects on the rate of that change. This rule operates earlier in paroxytonic vowels, where rhythmic shortening occurs, but later in vowels followed by heavy (underlying voiceless) obstruents, where the vowel is shorter than in environments followed by light (underlying voiced) consonants. Some linguistic evidence indicates that /ö/ unrounds prior to the unrounding of /ü/; here the input is [⊃ low].

In the Western states speakers lose underlying //x// (which changes a preceding //ɒ// to /ɔ/, no less than do other heavy fricatives in other varieties of English, as in cost, soft, and cloth) in the environment [⊂ lingual]. The loss occurs earlier in dauber than in naughty, caught, and dawn (see fn. 73), and reaches hawk last. The result is to make dauber rhyme with robber and the other words to sound like knotty, cot don, and hock, respectively. The reason why the operation of the rule specifying the change in question in a more recent environment implicates its operation in an earlier one is explained in §4.1 below. The rule strengthening the heavy consonants in High German affects input [⊂ grave, ⊂ lng] ones, where [grave] is the heavier feature: the only [- grave] heavy consonant is t, and it is affected first; of [x grave] inputs, p is affected prior to k. (I ignore the special cases where the inputs are adjacent to liquids.) In these instances (as in chain shifts), M, m, and u coefficients do not suffice; for one thing, the order of the consonants is probably the same both in prenuclear and postnuclear parts of the syllable.

For fully natural rules, there is required a principle, not yet formulated, which specifies which feature pairs can be linked with Greek-letter variables (for a discussion of other principles relating to these, cf. Principles 9c and 10 below).

Rule-inversion (Vennemann MS) has already been discussed. (The kind of rule-reversal found in decreolization as the result of borrowing of course poses no problems for the matter under discussion.) It may be worth pointing out here that even if some or all of the models already discussed and the principles and models to follow should prove grossly inadequate, the present proposals are not without value, since they show how a dynamic analysis could work, and since they therefore show that a dynamic grammar is quite feasible.

3.2 Exposition of metalinguistic principles. It is being taken for granted that Labov 1966 and 1969, together with other work still unpublished, has made unassailable all but the (a) part of Principle 8.

(8) New rules are added at the end of their component of the grammar, and they begin

(a) in a very limited environment, (b) variably--in this first and in each successive environment--and (c) often with a feature or two in a marked relative weighting.

(See some discussion on the gradualness of change in Schourup 1972.) Much work remains to be done in order to ascertain the conditions operating on rules at their inception. But the provisional principles below--9 is very tentative--will show what features are altered and how, as the rule spreads beyond its original, limited environment. The sequencing of the operations defined in Principles 9 and 10 are discussed in §3.3. Principle 10 will be augmented with Principle 19 in the discussion of the wave model in §4.1.

(9a) When natural developments delete a rule feature--i.e. generalize its value to a Greek-letter variable ranging over all feature values used in the system--to make the rule more general: heavier-weighted variable features in a given part of the rule (either input or environment) are changed earlier than lighter variable features in that part of the rule.[5.6]

(9b) When a feature is reweighted to its unmarked relative weighting: lighter-weighted variable features are affected earlier than heavier ones in the same part of the rule.[5.7]

(9c) When values of implicational feature coefficients (⊂,⊃) are changed: lighter-weighted variable features are affected earlier than heavier-weighted ones.

(10) Since heavier environments are earlier and faster than lighter ones, it may be said that rules effect changes at a faster rate, i.e. earlier, in greater quantity, and to a greater extent, in the presence of (a) heavier-weighted variable features;[5.8] a faster rate also accompanies (b) a marked value, if the coefficient is a Greek-letter variable; and (c) a plus value if the coefficient is ⊃, and a minus value if it is ⊂. (Note that 10b pertains only to variable features, sometimes parenthesized in variable rules.)

It seems probable too that we should regard higher items in curly brackets as faster or earlier than lower ones. Note the Greek-letter variable, ω, first suggested by Chin-Wu Kim to represent the extreme values of a multivalued feature, i.e. plus and minus in a ternary system. Note that [α F] may refer to the absolute (plus, mid, or minus) values of [ω F] or to the marking values of [α F] or [$\bar{\alpha}$ F] (where the bar above negates the value). Principle 10 ensures that when [α F_i] and [α F_j] or [$\bar{\alpha}$ F_j] appear in the same segment (where $F_i > F_j$), the [m F_i, u F_j] values will have a faster rate than [u F_i, m F_j]. Principle 10c is an example of a higher-level (viz. chain-shift) unmarking which overrules feature-unmarking according to Principle 1b, as already noted.

Before illustrating the application of these principles, it should be pointed out that there are two ways in which they can combine to cause the acceleration of an originally slower input or environment variable ahead of an originally faster one. Principle 9b may combine with 10a, or Principle 9a may combine with 10b. To take the latter case first, if an input feature is generalized (according to Principle 9a) from [u F_i] to [α F_i], then Principle 10b dictates that [m F_i] will--after an interim of readjustment perhaps--be faster than [u F_i], even though the rule operated with [u F_i] before the generalization to include [m F_i]. See the input to rule 11 below for an example. Similarly, if a lighter-weighted and slower variable environment feature is, in line with Principle 9b, reweighted to a heavier weight, Principle 10a will cause the environment of the reweighted variable feature to become faster than those it had been reweighted over, even though they were faster before the reweighting. This will also be illustrated in rule 11. Note that the principles just enunciated make empirically vulnerable predictions. For example, there should be no acceleration of the first sort, i.e. due to reweighting, in rules where features have their unmarked relative weightings.

The example to be given now is based on Labov 1972a.[59] Labov points out that /æ/ is 'tensed' (i.e. changed from the unmarked [x pharyngeal widening] to the marked [+ pharyngeal widening])[60] before (a) heavy (i.e. underlying voiceless) fricatives,

abbreviated F; (b) light (i.e. underlying voiced) stops, which are abbreviated $; and (c) nasals, abbreviated N. The resulting 'tense' vowel is written /æ/. As a result of this prior rule, the F and $ environments can be unambiguously designated as [α continuant, β voiced], provided they are non-nasal. Features in rule 11 that lack implicational coefficients or parentheses are categorical, i.e. non-variable parts of the rule. Within a given segment, heavier-weighted features are written above lighter ones.

$$(11)\quad \begin{bmatrix} \text{V} \\ \text{m accent} \\ \text{(u grave)} \\ \supset \text{low} \\ \text{m phar. wid.} \end{bmatrix} \rightarrow [\supset \text{low}] \;/\; \_\_ \begin{bmatrix} \text{(m continuant)} \\ \text{(u voiced)} \\ \subset \text{nasal} \end{bmatrix} C_o \#$$

Table 3. Isolects generated by rule 11.

Stage i								Stage ii		
Isolect								Isolect		
1	2	3	4	5	6	7	8	9	10	11
(F)	(F)	(F)	($)	(N)	N	N	(N)	(N)	N	N
	($)	($)	(F)	($)	($)	$		($)	($)	$
		(N)	(N)	(F)	(F)	F		(F)	(F)	F

Earlier lects, or earlier environments for the operation of rule 11 in a given lect, are to the left; later ones are on the right. Stage i represents the change of a low nucleus to a mid one; stage ii represents the change from mid to high.

Rule 11 changes a [+ phar. wid.] (tense) low (later mid also) nucleus to a mid (later high also) nucleus in a word-final accented syllable before F, $, and N at rates specified by Principles 9 and 10. (The use of the feature [pharyngeal widening in this rule is problematic, in view of the designation of underlying and post-vowel-change heavy vowels the same way. But see fn. 73; it is possible that [peripheral] could be used here.) Isolect 1 represents the (long since past) fastest environment in operation--[m cnt, u voi, m nas], i.e. F. If the heaviest variable feature (viz. [(m cnt)])

generalizes first according to Principle 9a, it cannot represent either of the other two possible environments ($ or N) without further changes in other features,[1] so no new isolect can result. But when [u voi] is then generalized to include the specification [m voi], both $ and F environments are now specified, viz. as [α cnt, β voi, m nas]. The result is the unattested isolect 2. Then Principle 10b dictates that $ ([M cnt, m voi, m nas]) should accelerate ahead of F after a period of readjustment, during which the change might occur in the two environments at equal rates. The data from Labov show that the lightest-weighted variable feature in the environment ([⊃ nas]) generalizes during this interim, creating isolect 3 (attested in Labov 1972a:137). The reweighting of $ and F is consummated in isolect 4, which is not attested.

Isolect 5 is attested in the speech of a sixty-year-old Jewish male (Labov 1972a:144). It is notable that in the speech of this informant the input has generalized, according to Principle 9a, to [α grave] so that rule 11 affects back-vowel as well as front-vowel inputs. Indeed, the change effected by rule 11 is more advanced for back vowels in the speech of the informant for isolect 5 than for front vowels, as stipulated in Principle 10b. The informant in question has raised /ɔ/ to a position as high as, or higher than, /æ/ has reached in any environment in his speech. The ordering of the successive generalizations and reweightings in rule 11 will be discussed in §3.3. The form which rule 11 has in isolect 5 is shown as rule 12:

$$(12)\quad \begin{bmatrix} \text{V} \\ \text{m accent} \\ \text{v grave} \\ \text{u low} \\ \text{u phar. wid.} \end{bmatrix} \rightarrow [\text{M low}] \;/\; \_\_ \left\{ \begin{matrix} [\text{u nas.}] \\ \begin{bmatrix} \alpha \text{ cont} \\ \beta \text{ voi} \\ \text{m nas} \end{bmatrix} \end{matrix} \right\} C_o \;\#\#$$

Once generalizations and reweightings have brought about changes in the rate of inputs and environments in rule 11, these remain until further changes that accord with Principles 9 and 10 take place; the originally earliest environment will not be earliest in the second stage of rule 11. But before discussing stage ii, it is necessary to conclude our consideration

of stage i. Labov refers to isolect 6, but gives no example of it. He refers to isolect 7 as exemplified in earlier documentation.

Stage ii is represented by the second stage of the output, viz. the change from a mid to a high position. The output for this rule (as for other examples) then goes through an isolectal series that parallels the isolects of stage i, except that the relative rates of the three environments is now permanently reweighted. Isolect 8 is represented by a Jewish male aged 57 (Labov 1972a:146), who, incidentally, lacks the acceleration of the back-vowel input. Isolect 9 is represented by a twenty-three-year-old Jewish male (Labov 1972a:148). His speech shows the acceleration of input/ɔ̄/ ahead of /ǣ/. Labov speaks as though some females have reached isolect 10, but 11 can only be found in very informal styles, if at all, in New York City.

The rule that tenses /æ/ has been generalized to all preconsonantal environments in Buffalo, where rule 11 now variably generates stage ii outputs in all of them. In other words, the last part of rule 11 is to be parenthesized as an environment variable, the lightest-weighted of all: $(C_o\#\#)_4$. This advanced development suggests the possibility that Buffalo might be the origin of the rules. Detroit and Des Plains (a suburb of Chicago) have the rule that tenses /æ/ generalized to all preconsonantal environments. Labov thinks that the reweighting which made N the fastest preconsonantal environment had already occurred when rule 11 began in Detroit. Detroit has isolect 8 already attested, but Des Plaines may not have developed beyond stage i. It is evident that, as rule 11 spread to the West, changes in the environment outpaced the extension of the output to stage ii, in contrast with what happened in the East.

3.3 Interrelations of time factors in rules. We have seen several instances of rules having temporal sequencings in more than one part of the same rule--input, environment, and output--as in rules 5 and 11. This raises the question of how the temporal sequencings are meshed together in the single dimension of real time. It has already been observed that most of the rules of the sort being considered show the progression of a

given output through all the sequences defined by the variables in the structural description (i.e. input and environment). This may be called the normal situation; it does not always obtain. It has also been noted in connection with the developments of rule 11 in Detroit and New York City that the changes in the environment did not precede stage i in the latter, but did precede stage i in Detroit. Here is a difference in the intersequencing of the temporal changes in the output and in the environment. Further, it has been pointed out that isolect 8 in New York does not have the input feature [(u grave)] generalized to [α grave], although this generalization has occurred in isolects 7 and 9. Here is illustrated a difference in the intersequencing of the inputs and outputs of rule 11.

The problem may be made clearer by showing the different sequences of the nine outputs of rule 5a according to whether the input feature [lingual] is heavier or lighter than the environment feature [low]. When input [lingual] is heavier than output [low], the outputs are sequenced from earlier to later as follows:

Dorsals / ___ i
Dorsals / ___ e
Dorsals / ___ a
Apicals / ___ i
Apicals / ___ e
Apicals / ___ a
Labials / ___ i
Labials / ___ e
Labials / ___ a

(Cf. the discussion of Tables 1 and 2 in §3.1.) If the input feature [lingual] is lighter-weighted than the environment feature [low], the sequencing of the outputs from earlier to later is as follows:

Dorsals / ___ i
Apicals / ___ i
Labials / ___ i
Dorsals / ___ e
Apicals / ___ e
Labials / ___ e
Dorsals / ___ a
Dorsals / ___ a
Dorsals / ___ a

Perhaps general principles will be discovered to show which of the above is more natural. Of course, the explanation may well lie simply in feature weightings. But it may lie in universal principles which dictate what the unmarked temporal priorities are among input, environment, and output. If the explanation lies in feature weightings, then numerical weights (as in rule 3 above) would be the most natural notation to suggest itself. But if the explanation lies in more general principles governing the sequencing of different parts of a rule, then the more natural notation might be rate indexes, attached as conditions to rules or (in the case of a monolectal rule) written over the arrow. Such rate indexes might simply abbreviate generalizations and reweightings in the environment as G and R, respectively, and those in the input as g and r; successive outputs or stages in the change represented by the rule could be designated with subscript i, ii, etc. Principles 9 and 10 would define which features were to be affected by G, R, g, and r. The code symbols could be sequenced from left to right in the order of time above the arrow in a rule. The change discussed in the preceding section developed differently in its westward spread from the way it developed in New York City. In New York City, the sequence of developments presumably (not all the facts are known about the [+ grave] input) has been: two environmental reweightings and then generalization of input [grave], both of which occurred before stage ii was completed; the deletion of the part of the environment specifying oxytonesis has barely begun. Thus the rate index might be: $[RR]_i[g(G)]_{ii}$. The deletion of the segmental environment has not yet begun in New York City, as in Buffalo and the locales to the west. (Note that the change in question moves from city to city, usually skipping over the countryside.) In the Midwest, both the segmental environment and the part of the environment specifying oxytonesis have been deleted from the rule, but stage ii (output ii) has not been reached, at least in some areas, nor has input [+ grave] yet become involved. Here the rate indices are: $[RRGG]_i([g]_{ii})$. If, as seems probable, this is the unmarked weighting of the rate indices and the New York City sequence represents their marked weighting, then the indices tend toward an unmarked situation in which

environmental changes (feature-reweightings and generalizations) are prior to input generalizations. It should be noted here that in most of the analyses of changes in process examined, environmental changes occur in order during each (output) stage of a rule change. This in fact appears to be the normal algorithm for rate indices.

If rule 3a is slightly rewritten as 3a', the intersequencing of the outputs of the rule is provided for by both the implicational coefficients and the weighting operators:

(3a') $\left\{\begin{matrix}\underline{d}\\ \underline{t}\end{matrix}\right\} \rightarrow$ Ø / C [2⊂ w.b.] __ ## [1⊂ nuc]

(See Fasold 1970 for the use of numerical weighting operators.) The initial environment is (a) [u w.b., u nuc]. When the implicational value of the lighter feature changes, as provided by Principle 9c, it becomes [m nuc], since [M nuc] (the satellite of a compound nucleus) is not possible here. When the value of the heavier-weighted feature changes to [M w.b.], we have the situation in pas+t, which is more like the environment in mist (containing no boundary) but actually promoting the rule's operation more than in mist but less than in pass#ed or miss#ed. As the heavier feature becomes [m w.b.], the environment is (c) [m w.b., u nuc], as when pass#ed and miss#ed are followed by a non-vowel. Note that the lighter-weighted feature has reverted to its original u value. In fact, Principle 13 governs the intersequencing of such weighted features:

(13) When a heavier-weighted variable feature changes its value, the successively lightest-weighted variable features that have implicational coefficients go through the entire sequence of values provided in Principles 10b and 10c.

A heavier-weighted variable feature would not, of course, be reweighted before a lighter variable feature (Principle 9c). An examination of the sequencing of environment relative weightings in Table 1 will show why Principles 9b and 13 have to be as stated. Only in this way will lighter-weighted features actually have less effects on variable rules, i.e. in the

calculus of the environments.[42] The last environment in which rule 3a' operates is (d) [m w.b., m nuc].

One who believes in the universality of natural developments in language will entertain a sanguine view of the possibility of simplifying rules like 11 because of future insights on the general conditions governing the initial forms of new rules.

4 THE WAVE MODEL, LANGUAGE COMMUNITIES AND SPEECH COMMUNITIES

4.0 The language community. The framework which is assumed for the present undertaking is one in which the notion of 'the [English] language' is taken quite seriously. Those who communicate competently in English, with all its variants, are assumed to constitute the language community of English-users. The resources of English, and in particular its patterns of variation, may be allocated in different ways within different speech communities[63] e.g. 'r-lessness' is highly valued and 'r-fulness' lowly valued in some speech communities within the English-language community, while in others the converse evaluation obtains.[64]

The grammatical (including phonological) rules of a language system include only such as would potentially be available to contemporary learners of the language without benefit of historical knowledge. Only materials that could be naturally collocated within one system would be included, a statement whose truth has to be accepted, even though little is yet known about the (natural) limits of language systems. Not all lects will be equally intelligible to other lects, given the directionality of markings, implications, and the like, even in socially neutral contexts. But easy adjustments would be expected when the users of the language move from one speech community to another. To be sure, those most familiar with more leveled forms of English grammar would have learning problems when they moved to communities where less leveled forms of the language were frequent, and these would be different from the problems encountered by those moving from regions where less leveled varieties existed to regions where more leveled varieties were frequent. Some would probably have to learn more than others, as I have pointed out elsewhere.[65]

New lexical uses would have to be learned by all, as anyone who has served in the armed forces realizes. New uses of items present in all varieties have to be learned, and the absence of an item in one variety presents problems for its speakers in other areas, as well as conversely.[6]

An overall system is a union, rather than an intersection, of subsystems. While it cannot be open-ended if it is to be useful and meaningful for the linguist, its limits need not be rigid (as envisioned in Agard 1971), but can be left flexible. One must distinguish the diverse effects of natural developments from within and of mixture due to contact with other systems. The internal mixing of subsystems is still fairly lacking in sophisticated investigations, but two notions may be tentatively put forward on the basis of what little is known. Like cross-system mixture, subsystem mixture results in leveling, e.g. the varieties of English found in the Midwestern and Western States and BVE in Northern cities across the country (even though in each specific city the contributions from regional varieties of BVE have varied a great deal).[7] Secondly, mixing of subsystems is not likely (pace Sapir 160-1) to result in new systems, in the manner that mixing systems is. I would reject the term creolization for the mixing of subsystems within a system, though not for mixing different components (e.g. the lexicon) of different systems. Here the term has a valid use.

Studies of a large number of phonological rules in English convinced me some years ago that rules can not only be ordered implicationally, but that implications can branch off and form blocs within which only language-users familiar with a particular over-all type (perhaps dialect) would be expected to 'know' the internal subimplications. As noted in Bailey 1972, the whole bloc of implications may fill one place in the implicational ordering of the rules for language-users not familiar with the details of that bloc of rules. As a result, the occurrence of any single rule from the bloc in question would be equivalent to the whole bloc for the outsiders.

One problem that has received considerable attention in recent years may cease to be such a large problem in the polylectal framework: abstractness and

absolute neutralization (Kiparsky MS). For it would seldom be the case that what was completely abstract in one lect of the language system would be so in all the others that a speaker-hearer would be familiar with. In other words, even speakers for whom bad, bared, bed, bid, and beard were alike in some style would nevertheless normally be familiar with other lects, and precisely other styles of their own pronunciation, in which the outputs were not neutralized.[6,8] Speakers of BVE who often neutralize then and den do not over-correct den to then, as the monolectal assumption would predict, since the alternation [d] : [ð] in then keeps [d] here apart from [d] in den. When radio announcers over-correct noon to ['niʉn], it is precisely because they are aware that other lects do not neutralize /u/ and /ʊ/ after /n/; they just do not know which lexical items have which underlying vowel.

Not all variation is of course patterned. Besides the non-identicalness of any two pronunciations of the same word, even by a given speaker, Morgan (MS) suggests that situations can get so complex that the rules simply are not prepared to handle them and break down. The result is that a speaker unsystematically produces an output that fits some aspect of the rule (e.g. an agreement rule), but which may not be strictly in accord with the rule. This would be especially likely where two rules might apply in similar situations; the choice might simply be made randomly by a speaker.

4.1 The wave model. The isolects in Table 1 (in §3.1) are temporally differentiated: the isolect generated by the operation of rule 3a in environment a (i.e. mist before a non-vowel) is prior to the one generated by the operation of the rule in environment b (i.e. mist before a vowel); this is prior to the isolect generated by the rule in environment c (i.e. miss#ed before a non-vowel); and this is in turn prior to the isolect generated by the rule in environment d (i.e. miss#ed before a vowel). Speakers intuitively know Principle 14, which is a corollary of Principle 10a.[9]

(14) The operation of a rule in a lighter-weighted environment implies its operation in heavier-weighted environments. (If environment a is heavier-weighted than b, and b is heavier than c, then: c ⊃ b ⊃ a.)

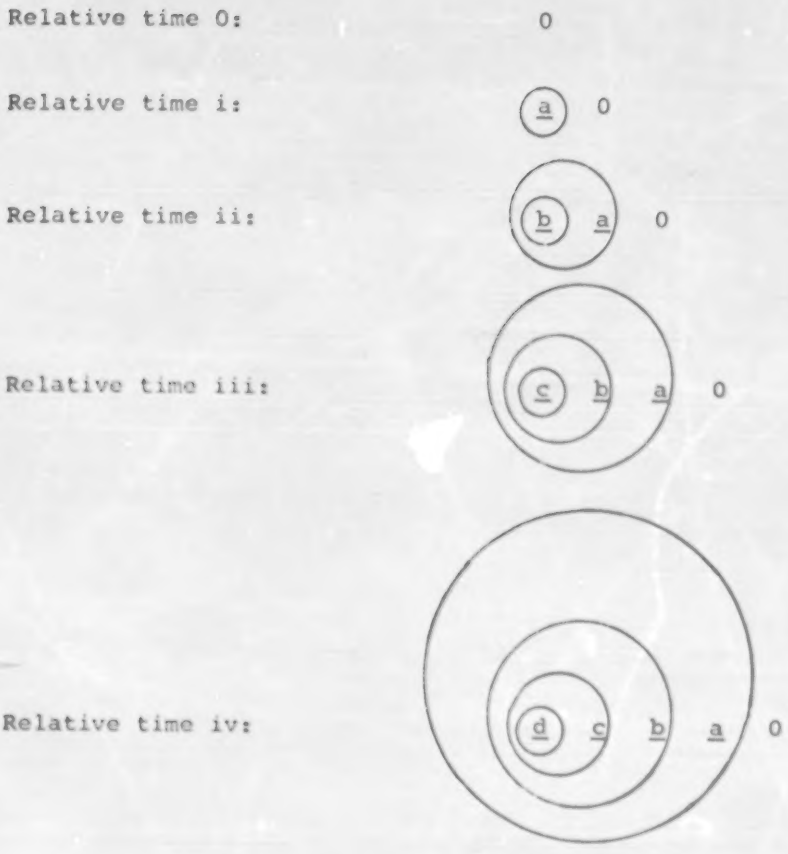


Fig. 2. The Simplest Form of the Wave Model. (The letters represent successively later, or lighter-weighted, environments in which the rule operates.)

Fig. 2 portrays the spread of the isolects of rule 3a through social space as a simple wave. The wave is different for each relative time. Relative times are defined on minimal (isolectal) changes. Each new 'point' in social space results from 'crossing' a single social barrier, i.e. from a single difference in social characteristics resulting from differences in age, sex, social class, ethnic groupings, etc., including the urban/rural difference. The point of origin is the point where the most recent development has occurred--d at time iv, c at time iii, etc. Fig. 2 is unaffected by the reweighting that occurs in rule 3b; one simply substitutes environment b' and c' of Table 2 for b and c, respectively, in Fig. 2. As a wave is propagated through social space, it may have a different development (e.g. it may reweight at some point different from the origin) in one direction from the developments found in other directions. (See table 8 in §4.2.)

In order to bring Table 1 into accord with Principle 8b in §3.2, each environment must begin variably, as in Table 4. Fig. 3 represents this information in a different manner from the portrayal of Table 1 in Fig. 2.

Table 4. Temporal development of isolects of rule 3a according to Principle 8b. (Variable elements are parenthesized.)

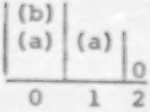
Environment:		a	b	c	d
Time:	Isolect:	mist##C	mist##V	miss#ed##C	miss#ed##V
i	(a)	mis(t)	mist	missed	missed
ii	(b)	mis(t)	mis(t)	missed	missed
iii	(c)	mis(t)	mis(t)	miss(ed)	missed
iv	(d)	mis(t)	mis(t)	miss(ed)	miss(ed)
v	a	mis'	mis(t)	miss(ed)	miss(ed)
vi	b	mis'	mis'	miss(ed)	miss(ed)
vii	c	mis'	mis'	miss'	miss(ed)
viii	d	mis'	mis'	miss'	miss'

Relative time:

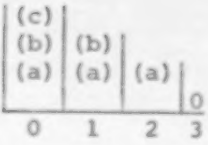
0

i

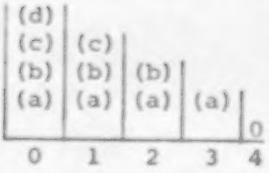
ii



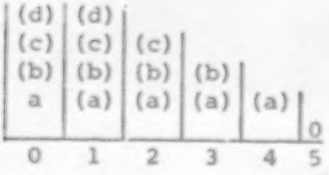
iii



iv

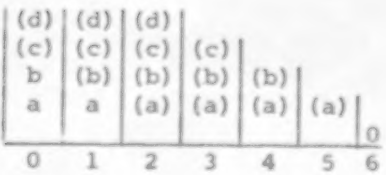


v



Lect: a

vi



Lect: b a

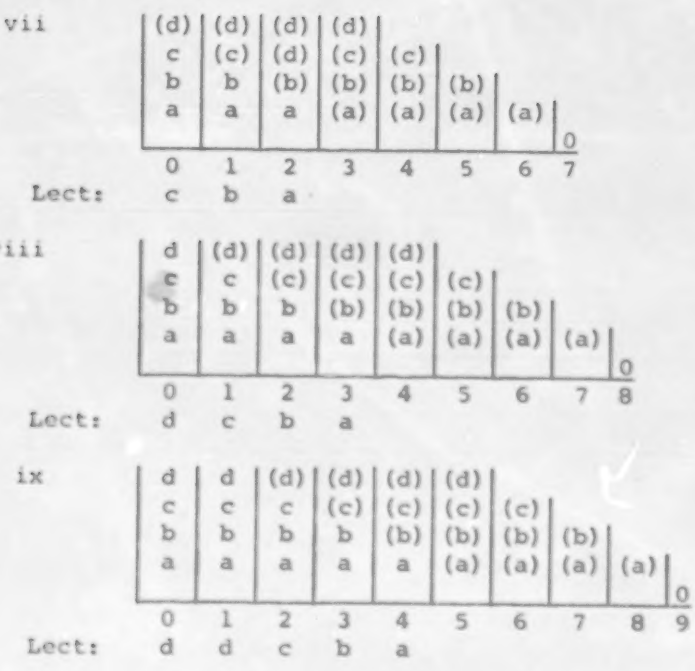
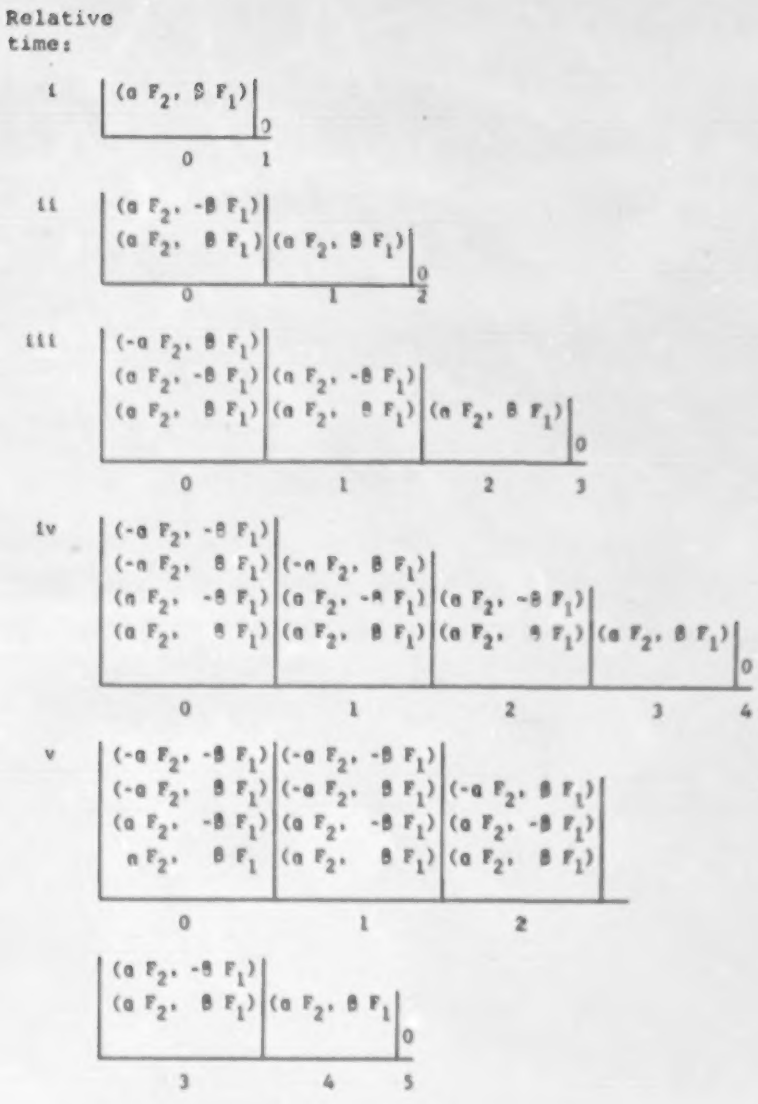

Relative time:
vii
(d) (d) (d) (d)
c (c) (d) (c) (c)
b b (b) (b) (b) (b)
a a a (a) (a) (a) (a)
0
0 1 2 3 4 5 6 7
Lect: c b a
viii
d (d) (d) (d) (d) (d)
c c (c) (c) (c) (c)
b b b (b) (b) (b) (b)
a a a a (a) (a) (a) (a)
0
0 1 2 3 4 5 6 7 8
Lect: d c b a
ix
d d (d) (d) (d) (d)
c c c (c) (c) (c) (c)
b b b b (b) (b) (b) (b)
a a a a a (a) (a) (a) (a)
0
0 1 2 3 4 5 6 7 8 9
Lect: d d c b a

Fig. 3. Propagation of Temporal Lects Shown in Table 4 Through Social Space.

In Fig. 3 the vertical dimension is time; the horizontal dimension represents points successively remote from the point of origin (0) in social space, i.e. points separated from the original lect by successively more social barriers. Variable environments for the operation of rule 3a are parenthesized. At times later than those shown here the pattern continues rightward.

Fig. 3 shows how to resolve the second static paradox (Becker 1967:64). Dialect geography shows that rules get less general at the periphery of the areas where they exist; but the logic of the acquisition of language by children shows, as do many rule changes, that rules get more--not less--general, i.e. by feature


Relative time:
i
(α F2, β F1)
0
1
ii
(α F2, -β F1)
(α F2, β F1)
(α F2, β F1)
0
1
2
iii
(-α F2, β F1)
(α F2, -β F1)
(α F2, β F1)
(α F2, -β F1)
(α F2, β F1)
(α F2, β F1)
0
1
2
3
iv
(-α F2, -β F1)
(-α F2, β F1)
(α F2, -β F1)
(α F2, β F1)
(-α F2, β F1)
(α F2, -β F1)
(α F2, β F1)
(α F2, β F1)
(α F2, β F1)
0
1
2
3
4
v
(-α F2, -β F1)
(-α F2, β F1)
(α F2, -β F1)
α F2, β F1
(-α F2, -β F1)
(-α F2, β F1)
(α F2, -β F1)
(α F2, β F1)
(-α F2, β F1)
(α F2, -β F1)
(α F2, β F1)
0
1
2
(α F2, -β F1)
(α F2, β F1)
(α F2, β F1)
0
3
4
5

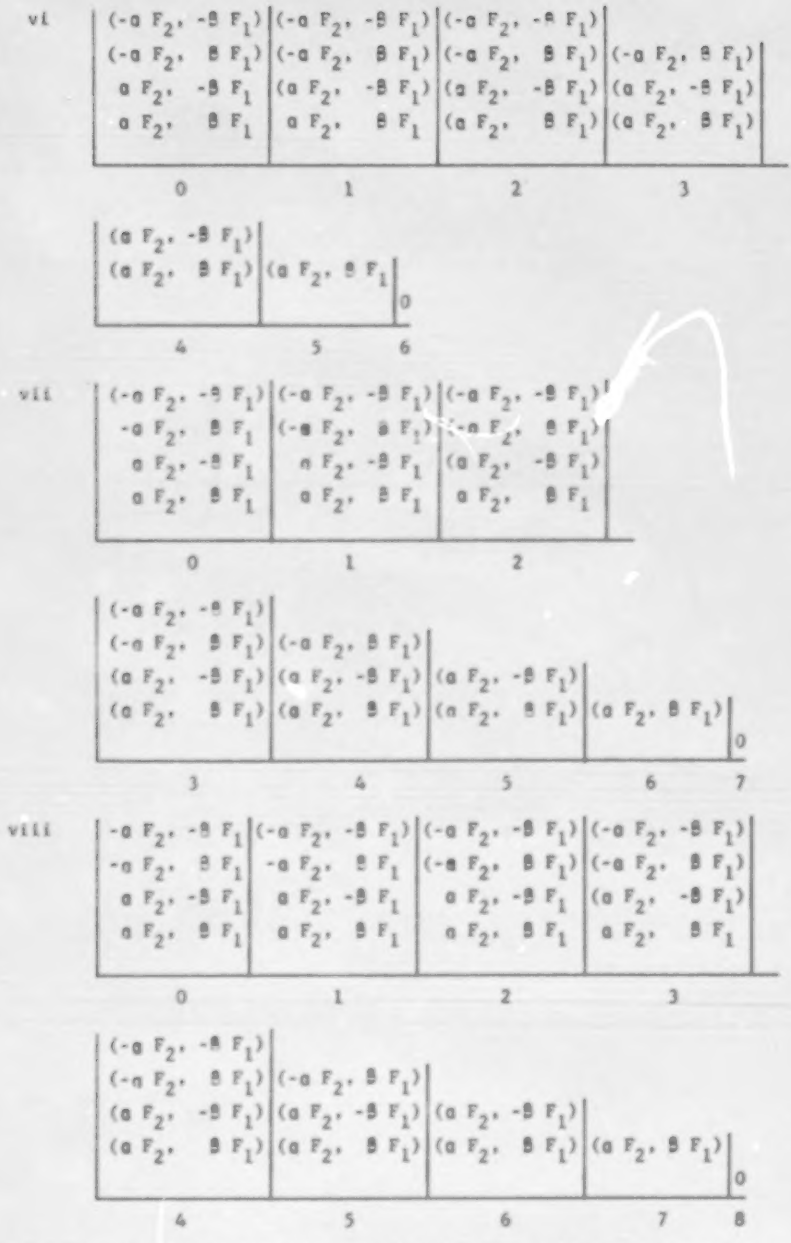


Fig. 4. Another Version of Fig. 3, Employing Features.

deletions or value-generalizations. In Fig. 3, rules do indeed get less general at points in social space more and more remote from the origin, simply because the earliness of the most limited environment for the rule's operation ensures that it has had time to spread farthest. But at any one point in social space the rule indeed continues to become more general until it is categorical (non-variable) in all environments, unless something causes the rule to die out before this happens.[70] This also explains the principle of the antiquity of peripheral phenomena in areal linguistics.

Two principles have been assumed in Fig. 3 and in the discussion up to this point:

(15) A single isolectal change creates a new relative time.

(16) All the environments of a rule become variable before the oldest becomes categorical.

Principle 16 is probably not correct for all instances (cf. Table 5 below), and supplementary algorithms will be required. The principle is given here only to provide a handle for the discussion. The correct algorithm for generating matrixes such as those shown in Fig. 3 may require that the oldest (earliest, fastest) environment become categorical in the isolect in which the last environment begins to be (variably) operative. This seems unlikely, as does the idea that variability persists through a given number of isolects (equal, perhaps, to the number of variable environments, as in Fig. 3). The variability may well depend on clock time in some manner. All such questions must be left for future determination.

Fig. 4 (p. 72) is a slightly more technical formulation of Fig. 3 in terms of the variable features that create the four environments of rule 3a. Note that, as before, the lowest-number isolects are the oldest. See Trudgill MS for interesting observations on models for the diffusion of a change through social and geographical space.

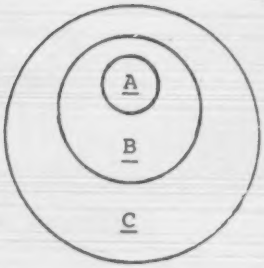
The same notations used in Fig. 3 are used in Fig. 4. F_2 is a feature that is heavier-weighted than F_1. At each relative time subsequent to those shown here, each isolect moves one step to the right.

It is important to stress that language-users internalize language patterns, and that these, rather

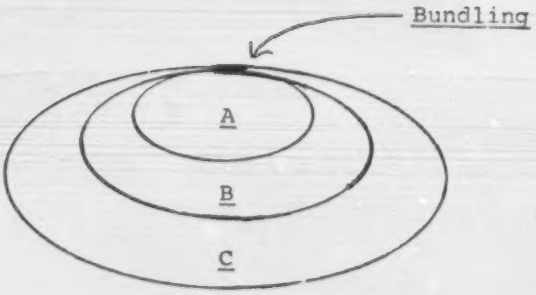
than spatial distributions or statistical findings, are what are of prime concern to the linguist. It should be clear to the reader that the linguistic pattern, viz. C ⊃ B ⊃ A, is the same in both Fig. 5a and 5b; that for what is linguistically relevant here the bundling in Fig. 5b is of no importance, contrary to claims of dialect geographers.[1] The importance of such patterns, together with a corroboration of the correctness of the wave model's predictions with regard to previously unknown data, has been demonstrated in Bickerton 1971, where the patterning shown in Table 5 was verified. As for greater and lesser statistics which language-users interpret and produce so competently let us now turn to a discussion of how the wave model and a couple of general principles account for this without the linguist's having to embrace the scarecely credible view that children learn and internalize relative statistics.

Table 5. Isolectal distributions of the infinitive markers tu ('to') and fu ('for') in Guyana Creole English, adapted from Bickerton 1971. (The basilect is at time 0; the acrolect, at time vi. The isolect at time i was not attested in the data.)

	Verb classes:		
Relative times:	I	II	III
0	fu	fu	fu
*i	tu/fu	fu	fu
ii	tu	fu	fu
iii	tu	tu/fu	fu
iv	tu	tu	fu
v	tu	tu	tu/fu
vi	tu	tu	tu



(a)



(b)

Fig. 5. The Spatial Pattern, C ⊃ B ⊃ A, With 'Dialectal' Bundling in (b), But Not in (a). (See fnn. 68 and 71.)

Data which will be cited later show that incipient changes begin slowly, that after they get going they quickly pick up momentum, and that they begin to slow down as they near 100% categoricality. This forms an ∫-curve, as in Fig. 6. A principle like 17 governs this statistical distribution. There results the micromodel of statistical change seen as Fig. 7, which is adapted from the simpler model in Labov 1972:106; it illustrates the development of rule 18.

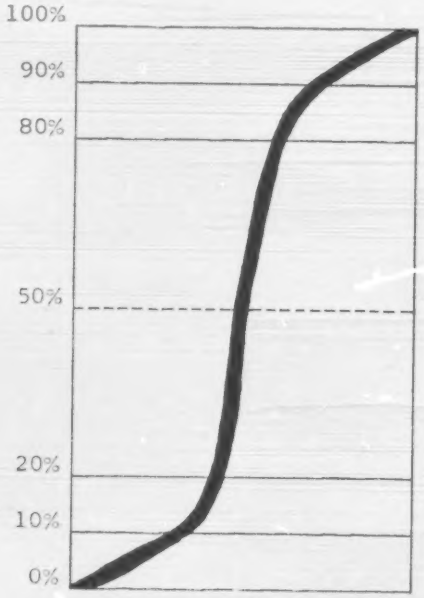


Fig. 6. The ∫-curve generated by Principle 17.

(17) A given change begins quite gradually; after reaching a certain point (say, twenty per cent), it picks up momentum and proceeds at a much faster rate; and finally tails off slowly before reaching completion. The result is an ∫-curve: the statistical differences among isolects in the middle relative times of the change will be greater than the statistical differences among the early and late isolects.

(18) $X \rightarrow Z \; / \; \_\_ \; \left\{ \begin{matrix} a \\ b \\ c \\ d \end{matrix} \right\}$

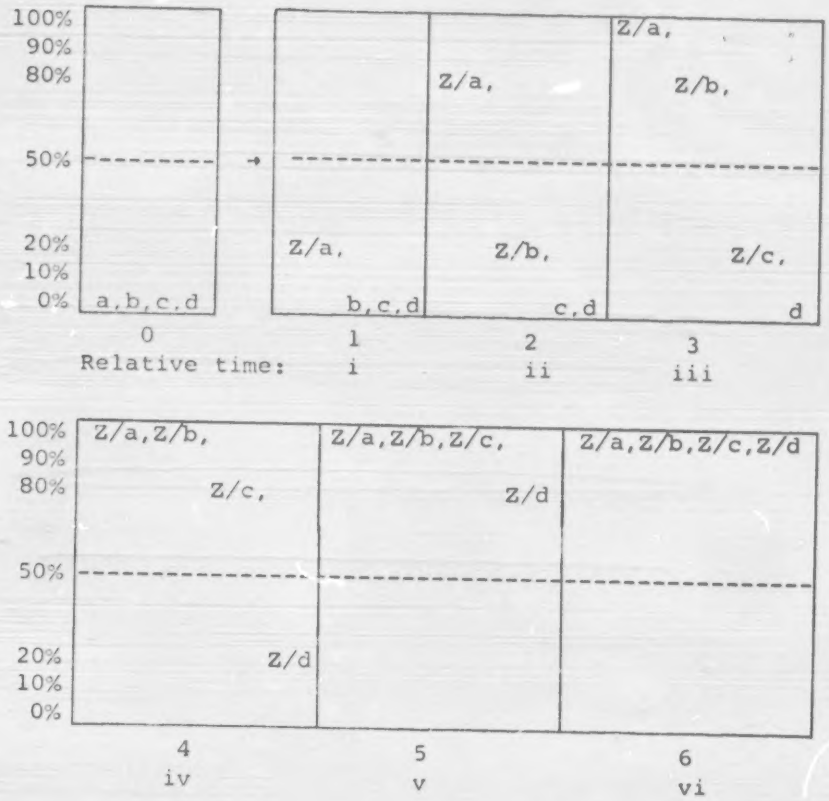


Fig. 7. The Statistical Development of Rule 18.

The vertical dimension in Fig. 7 is that of increasing statistical implementation of the rule, as in Fig. 6. Time or space move rightward from the point of origin, 0. Isolects are represented by Arabic numerals; relative times, by small Roman numerals. The notation Z/a means that the output is present in environment a in the percentage of possibilities indicated on the vertical scale.

The application of the principles just discussed to Fig. 3 results in Fig. 8. The application of Principle 10 in time and space, as in Fig. 8, presupposes Principle (19):

(19a) At a given point in social space, the operation of a rule will be proportionately greater in earlier or heavier-weighted environments than in later or lighter-weighted ones.

(19b) A rule will operate in a given environment proportionately more frequently--up to 100%--at points in social space nearer to the point of origin than at points more remote from the origin.

Env. d:	10%			
Env. c:	20%	10%		
Env. b:	80%	20%	10%	
Env. a:	90%	80%	20%	10%
Locale:	0	1	2	3

Relative time iv

20%	10%		
80%	20%	10%	
90%	80%	20%	10%
100%	90%	80%	20%
0	1	2	3

Relative time v

Env. d:	80%	20%	10%	
Env. c:	90%	80%	20%	10%
Env. b:	100%	90%	80%	20%
Env. a:	100%	100%	90%	80%

Relative time vi

90%	80%	20%	10%
100%	90%	80%	20%
100%	100%	90%	80%
100%	100%	100%	90%

Relative time vii

Fig. 8. Application of Principle Under Discussion to Fig. 3.

In contrast with the increasing attenuation of physical waves in time and space, the waves under discussion show increasing strength in time (according to Principle 17), although at any given moment those parts more distant from the origin than others will be statistically weaker.

The wave-like nature of the statistics in Fig. 8 can be clearly seen in the breakdown of the figure at relative time v, shown here as Fig. 9. Exemplifications of something like Fig. 8 with real linguistic data are provided later on in Tables 9 and 10. These tables illustrate both the wave-like nature of the statistics and the ∫-curve of Principle 17.

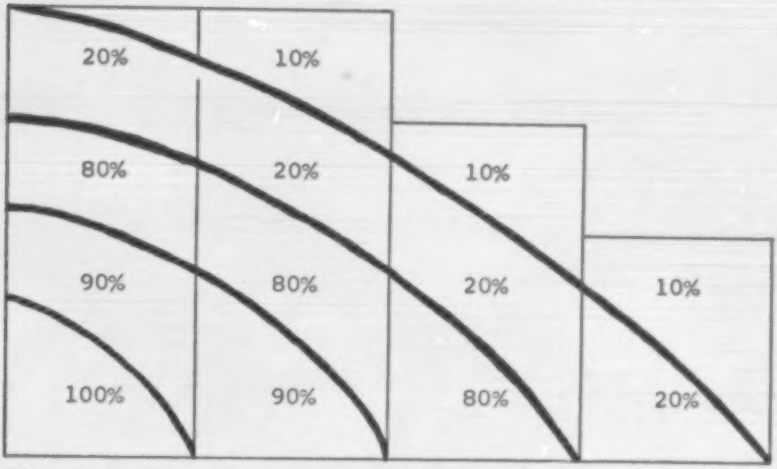


Fig. 9. Portrayal of Wave-like Nature of the Statistics in Fig. 8 at Relative Time v. (The wave loses its impetus at progressively more distant points in social space, at least in the relative statistics for any given moment.)

Cedergren & D. Sankoff (MS) have replaced Labov's emphasis on statistics with an emphasis on probabilities. This will certainly have a better chance of being a credible model of competence. One might hypothecate a universal (internal) bell curve or ∫-curve, and then seek to justify it; but learning complicated statistics will not be found credible. Probabilities are well-defined in a way that statistics are not; as Cedergren & Sankoff assert, "Frequencies are clearly part of performance, but we use them to estimate probabilities, which are part of the underlying model generating the observed behavior. It is our contention that these probabilities are properly part of competence." Of course, there is more to performance

than a failure to achieve competence probabilities, as these writers are well-aware. Their proposals deserve further investigation, provided one thing is kept in mind. In the papers just cited, rules are provided with a static or fixed input probability, which is affected not only by variable factors in the linguistic environment, but also by variations of style, socio-economic class, and the like. These scholars have informed me that the input probability could be provided with a curve, thus creating vector-like dynamic rules that would generate the variety of patterns generated by Cedergren and D. Sankoff, but in a different way. Instead of generating them all at once, or instead of selecting a given speaker and setting his or her input probability at [some percentage] depending on their socio-economic group and then calculating rule probabilities for each linguistic environment (see Cedergren and Sankoff), we would be more concerned with before-and-after relations among outputs, i.e. with generating all of the linguistic patterns of the language in the implicational sequence that holds valid for any speaker. Then, sociolinguistic algorithms of the sort proposed near the end of the present monograph could be applied for assigning the patterns so generated to the social parameters of a given speech community. A given pattern would be assigned to one style of a speaker in one class of the speech community, to another style of a speaker in another class, and so on. The linguistic parameters would be handled as proposed by Cedergren & D. Sankoff, but the input probability would ride on an $\int$-curve, so to speak. For recent discussion of related issues, the reader is referred to papers by Fasold, Bickerton, Wolfram, Cedergren, G. Sankoff, Anshen, and others in Bailey & Shuy 1973.

The writer's own difficulties with Cedergren and Sankoff's original proposals have to do not only with the static nature of the rules they have proposed and the failure to distinguish social from linguistic parameters, but also with the fact (not provided for in their proposal) that features are not independent. It is known that the values that promote or inhibit rule outputs may be quite different in lighter-weighted features according as the values of heavier-weighted features change. (Walt Wolfram has shown me some

quantitative data that make this statement indisputable: cf. Wolfram 1973.) None of these aspects of the original proposals by Cedergren and D. Sankoff is irremediable in their framework, and there is no reason why their sophisticated techniques have to be incompatible with the program set forth here.

Principle 20 enables the language-user to interpret (and produce) statistics in accord with the patterns of data just shown, without the language-user's having internalized (relative) numbers. The reader should note the asymmetry between Principle 20 and Principle 14, both of which are corollaries of Principle 10.

(20) What is quantitatively less is slower and later; what is more is earlier and faster. (If environment a is heavier-weighted than b, and if b is heavier than c, then: a > b > c.)

My view is that the competence pattern is the temporally-created implicational one, which is perceptually deduced from the preceding principle.

Fasold 1973, agreeing on the perceptual principle, examines the issue whether an inferred earlier-later principle is to be regarded as the correct competence principle. Fasold considers three cases in which the quantitative implications and the temporal ones disagree. The first of these is acceleration. Fasold speaks of a rule accelerating ahead of another, older one, but only cites instances of environments or inputs accelerating. And he thinks that a given instance of acceleration could occur at some point in social space other than the origin. I used to hold this view, but now think it highly unlikely. The difference in the forms of the wave for /ɪ/-raising in the direction of New York City and in the westward direction (discussed in §3.3) appears to be due to the rise of new metropolitan centers of greater importance than the one which the wave originally spread from. Ordinarily, the time required for such new centers to arise would far exceed the normal time required for rules to reach completion (categoricality). Given that reweighting or some other case of acceleration begins at the origin of the wave, the effect is at some point in time to rearrange the columns in a table like Table 4 above, as in Table 6 below:

Table 6. A variant of Table 4 above in which a reweighting following time v transposes columns b and c.

Environment:		a	b	c	d
Time:	Isolect:				
i	(a)	mis(t)	mist	missed	missed
ii	(b)	mis(t)	mis(t)	missed	missed
iii	(c)	mis(t)	mis(t)	miss(ed)	missed
iv	(d)	mis(t)	mis(t)	miss(ed)	miss(ed)
v	a	mis'	mis(t)	miss(ed)	miss(ed)
vi	b	mis'	miss'	mis(t)	miss(ed)
vii	c	mis'	miss'	mis'	miss(ed)
viii	d	mis'	miss'	mis'	miss'

Note that if the reweighting which causes the acceleration of column c ahead of b does not occur precisely when it does in Table 6 (see the broken line), it will not be detectable in this chart. But Fasold contends that in a quantitative chart (like Fig. 8 or Table 9 or 10) the statistics would be thrown off. I do not think this would be the case provided the columns are rearranged at the moment of acceleration in relative time. (Note that the lect at the origin of the wave is the one that is latest in time, viz. [d] in Table 6.) Clearly, however, further investigation is in order, with due consideration of the points made in Fasold's article. The real question is, of course, how listeners would perceive the statistics: would they internalize the columnar transposition? Probably not, though this applies only to those speakers having the reweighting, since the others could 'predict' such a reweighting and might be able to understand the columnar transposition caused by it. I know of no principle that would produce the acceleration of a later rule ahead of an older one, though I do not doubt that while both are still variable the later one would normally be statistically farther from categoricality than the older one. The one exception would occur when an older rule became stagnant, but a later rule continued to progress toward categoricality.

Since stagnant rules constitute Fasold's second kind of discordancy between the quantitative and temporal principle, these must be characterized now. For up to this point the discussion of variation, particularly the discussion of the ∫-curve, has assumed that rules proceed in time to completion, unless they die out and cease having any effect on the grammar. But in fact rules may freeze in mid course, so to speak, like the rule affecting the alternation of interdental fricatives and their corresponding stopped pronunciations in the lower middle class and the classes below it in New York City (Labov 1966:365-372). Such a pattern may remain static for years. However, Principle 20 causes listeners to interpret even static rules in vector terms. The frozen pattern represents the results of a time-differentiated spreading wave, so I see no problems for Principle 20 here.

Fasold's third kind of problematic case involves rule-inhibition. The rule desulcalizing /r/ when not prevocalic began in England as [- favored], but at some point became [+ favored]; and it changed from [+ favored] to [- favored] for most classes in New York City at the time of World War II, as Labov 1966 shows. (See discussion of [favored] in §4.4.) In the latter example, older speakers simply have the rule in its completed form; this is lect 0. Later lects show the usual statistical developments, for Labov has shown, both for this rule in New York City and for the rule inhibiting the second output of rule 23 on Martha's Vineyard, that the quantities which are charted for rule-inhibition exhibit the same pattern as those in a rule like rule 3. (See Table 9 below.) The statistics for the inhibition of a rule still progressing toward categoricality should present a chart something like Table 7 if no changes occur in the form of the rule (as in fact was the case on Martha's Vineyard). Note that the inhibition of the rule does not disturb the historical relations of more and less among the environments; i.e. it is inhibited more in the originally later (lighter) environments than in the originally earlier (heavier) environments.

If it is true that rule-inhibition does not disturb the patterns of rule development, it will be necessary to explain an apparent counterexample through reweighting or in some other way. The example in question

Table 7. Presumed statistical relations in the development of a rule in earlier (a) and later (d) environments when a revaluation of the feature [favored] occurs following temporal lect 4.

Relative time:	Lect:	Age or other grouping:	Environments: a	b	c	d
iii	3	IV	80%	20%	10%	0%
iv	4	III	90%	80%	20%	10%
v	5	II	80%	20%	10%	0%
vi	6	I	20%	10%	0%	0%

involves the change of /ɒ/ to /ɔ/, which seems (McDavid 1940) to have reached the velar environment last in the Southeastern States, but which is the only environment where the change remains in the speech of some speakers from the northern Pacific Coast States, who have [ɔ] in dog and song, but [ɑ] in soft, cost, and cloth. Despite this problematic example, other instances of rule-inhibition known to the writer show no disturbance in the pattern created by the development of the rule.

A main point of Fasold's discussion fails to take into account the difference between natural changes and decreolization, a form of borrowing across systems. The latter is governed by the decreolization or mixture algorithm treated at the end of this monograph. The wave model applies to such patterns as well as to others, but Fasold may be right in maintaining that the relative time of different developments is so obscured as to be rendered meaningless in the difference between natural changes and changes which reverse this order as mesolects in the creole gradatum mix with (by borrowing from) the acrolect. Nonetheless, the implicationality of the wave model is maintained--this is the main point for the position taken in the present writing--and there is no reason to suppose that the decreolizing pattern obscures the directionality of natural changes

any more than rule inhibition in Table 7. See the earlier discussion of decreolization in connection with rule 3.

4.2 The variable rule for /ī/ in English. If the brain is to be credited with the ability to deal with the diverse patternings of the outputs of English /ī/ which the facts of communication demand, we must get away from the facts of geographical and social[7][8] repartitions of the variant outputs of this underlying unit. As will be seen on the map in Fig. 10 below, geographical dispersions can be so chaotic as to challenge the plausibility of any hypotheses about the orderliness of language variation and therefore of any hypothesis about the brain's manner of storing and using such variants in communication. In what follows, such non-linguistic patterns will be reduced to linguistic patterns, in which implicationally adjacent isolects are placed side by side, regardless of their geographical variation.

Let us begin with the pattern from which the others can be derived with principles already expounded. This pattern is that of the North of England, with data from Kolb 1966. The social characteristics of the informants for this data were kept as constant as possible, so that the geographical variable should be the only variable other than sex. Despite the social uniformity in the sources of these data, the resultant map (Fig. 10) is fairly chaotic.

In Fig. 10, isolect numbers are the same as in Table 8, but single parentheses indicate one deviation from the pattern in that table, and double parentheses denote two such deviations. Eighty-four sources of data are represented on the map. Of a total of 672 items containing //ī//, 33--or less than 5%--are deviant. Less deviance would probably result if sex differences were controlled in the data. The broken line separates the isolects having positive numbers or letters in Table 8. The dotted line surrounds the lectal area where geese is pronounced ['gəˑ^{1}s] or something similar. This possibly represents the result of a reordering of the sub-rules of the heavy-vowel shift (the one raising mid nuclei to high nuclei, and the one raising low nuclei to mid ones). The origin of the main wave is Lincoln. The origin of the later wave appears to be near Manchester (isolects B and C).

Fig. 10. Isolects for the Outputs of /ī/ in Different Linguistic Environments as Distributed in the North of England.

Table 8. Pattern of linguistically adjacent isolects for the outputs of /ī/ in the North of England

	*11	10	9	8	7	6	*5	*4	3	2	±1	0	±1	-2	-3	-4	-5	-6	*G	*F	E	*D	C	B	*A	*θ
about		u	u	u	u	u	u	u	u əu ao	u əu	u əu	u ao	u əu	u ao a	u ao	u ao	u ao a	u ao	u ao a	u ao a	a	a	ao a	ao a	ao		
night	i	i	i	i	ɛi	ɛ́j	ɛi	ɛi	ɛi	ɛi	ɐi	ae	Ei	i	i	i	i	i	i	i	i	i	i	i	i	a
died§	i	i	i	ɛi	ɛi	ɛi	ɛi	ɛi	ɐi	ɐi	ae	ae	ae	ae	Ei	i	i	i	i	i	i	i	i	i	a	a
-wrìght	i	i	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ɐi	ae	ae	ae	ae	ae	ae	ae	Ei	i	i	i	i	i	i	a	a	a
writing	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	a	a	a	a
Friday	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	a	a	a	a	a
knife	ɛi	ɛi	ɛi	ɛi	ɛi	ɛi	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	a	a	a	a	a	a
time	ɛi	ɛi	ɛi	ɛi	ɛi	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	a	a	a	a	a	a	a
sky	ɛi	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	ae	a	a	a	a	a	a	a	a

§Flies has been substituted for died in a few instances.

In Table 8 Ei indicates either the nucleus [ɛ^{i}] or the nucleus [ə^{i}]. The wave from the origin (0) is generated with different algorithms to the left and to the right. The isolects with negative numbers to the right of the origin are generated by the 'normal algorithm' and overlap with the later wave spreading from 0. Unattested isolects are starred. These may turn up in later data. Alternatively, there may be some kind of higher-level (dialectal?) boundary between isolects 6 and 3 and between isolects -6 and E. The data are inadequate to test this matter because the later wave overlaps and obliterates the ground of the older wave (see the mapping of these data in Fig. 10). Note that the [a] output of /ʊ/ (in about) accelerates ahead of the [a] output of /ɪ/ in isolects -2, -4, and -6. Because the older isolects are closer to the origins, the directionality of time sequencings must be read toward the origins. Thus the isolects with [i] -wright (as in cartwright) have not been completely affected by the rule in question at the points where the wave has arrived most recently.

The pattern as illustrated in Table 8 is generated with rule 21, which assumes, on the basis of data from other areas, that the prevelar environments are the slowest of all.

$$(21)\quad \begin{bmatrix} V \\ \text{m phar. wid.} \\ \text{m low} \\ 2 \subset \text{rhythmic length} \\ (\text{u grave}) \end{bmatrix} \rightarrow \begin{bmatrix} \subset \text{low} \\ \text{M grave} \end{bmatrix} \begin{bmatrix} \text{u nuclear} \\ \subset \text{low} \end{bmatrix} /$$

$$\_\_([\text{*m segmental}]) \left(\begin{bmatrix} C \\ 1 \subset \text{lingual} \\ 3 \supset \text{voiced} \end{bmatrix} \right)$$

Condition 1: At least one parenthesized element must be present in the environment.

Condition 2: $R_{\text{output peak}} > R_{\text{output satellite}}$ (R = rate) until the stage /a^a/ = [a] has been reached.

Condition 3: In the North of England, the environment is absent for the outputs of /ʊ̄/ when this input becomes operative; input /ī/ or /ū/ is still unchanged in older environments in the North of England.

We here extend the denotations of the implicational coefficients so that ⊃ denotes the order ↑, x, ↓ where gradient values are involved, while ⊂ denotes the reverse sequence. See feature 36 in the Appendix.

In rule 21, the input has two variable features; where no implicational coefficient or weighting numeral is present, variability is indicated by parentheses. The feature [⊂ rhythmic lengthening] causes paroxytonic environments (e.g. Friday, writing) to show later outputs than their corresponding oxytones (e.g. died, write), in accordance with the data under analysis. Input [(u grave)] ensures that changes of input /ū/ lag behind those of /ī/ (see on the acceleration of /ū/ ahead of /ī/ in England below). The input feature, [pharyngeal width], is somewhat doubtful.[3] Condition 2 ensures that the lowness of the output satellite lags behind that of the peak until the last stage is reached; the outputs for front inputs therefore are: (i) /$ɛ^i$/ or /$ə^i$/, the difference between which is ignored here in favor of the latter; (ii) /a^e/; (iii) /a^a/ = [a]. In the output, the feature [round] retains its same absolute values as in the input, but becomes marked in the output /$ɵ^u$/, which explains its later unmarking to /$ə^u$/ and /a^o/. Probably it unmarks and reassimilates in lects having /$ɵ^u$/. (The writer favors Chomsky and Halle's 1968:419-435 view of linking, despite the criticisms in Bach and Harms 1972, where the possibilities of distinguishing lower-level and higher-level unmarkings are not realized.) To see why the change of [ʊ grave] or [m grave] inputs to [M grave] is not unnatural, it is necessary to re-examine Table 8. There it is obvious that /$ə^i$/ does not occur in lects lacking changes of input /ū/, which are later than changes of /ī/. The compromise [M grave] position--central instead of either front or back--is presumably a higher-level

unmarking that overrules feature-unmarking; see Principle 1b in §3.0.

When the optional variable [*m segmental] (that is, a syllabic boundary) is present in the environment, the asterisk indicates that the rule categorically generates the latest output found in the lect in question. The data provide evidence only for sky, but evidence in other lects suggests that the formulation of 21 is correct. (Note that in Kolb's data the rule operates in Friday, so that a # following /d/ does not need to be posited for the rule here, as it does in other lects.)

The sequencing of the outputs of /ū/ parallels those of /ī/: /ə^{u}/ or /ə^{u}/, /a^{o}/, /a^{a}/ = [a], as in mouse. In the North of England, the environments of the rule appear to have little effect on the distribution of the environments — speakers apparently using some given output for all words in a given style of speaking.

The sequencing of the segmental environments in rule 21 depends, as usual, on the relative weightings of the features in the environment and on [rhythmic length] in the input segment. The weighting [⊂ lingual] ensures that labial environments are faster than apical ones, while velar environments are slowest of all. Although the data offer no evidence for velars, these form the slowest environment in all other lects for which there is evidence. In English /ī/ precedes #g# only in tiger, Geiger, Nygren, and migratory (and words having the same base form as this last); /ū/ does not occur before grave consonants at all. Within each category formed by a value of [lingual], [⊂ rhythmic length] generates a given output in an accented syllable followed by unaccented syllables in the same word prior to generating that output in oxytonic syllables. Thus, Friday and writing change before died, flies, and night.[14] Within each combination of [lingual] and [rhythmic length] values, underlying voiced consonants provide faster environments than underlying voiceless consonants.

Table 8 shows two patterns for intersequencing outputs and environments. The normal algorithm sequences the two outputs of the original wave, [ə^{i}] and [a^{e}], in each environment before moving to the next, as in isolects 0 through -6. In all attested isolects shown on the right of 0 in Table 8, [a^{e}] has already been

generated in the five heavier-weighted environments. Another algorithm is evidenced in the isolects on the left of isolect 0, since the five heavier-weighted environments have [ε^{i}] before [a^{e}] is generated in the heaviest, and then [ε^{i}] is successively generated in the lighter-weighted environments before [a^{e}] begins to be generated in all but the heaviest one. It is no great task to devise ad hoc rate indices for such intersequencing, and such notations probably have to be resorted to until more general principles governing the intersequencings are discovered. There would be no point in complicating rule 21 further, so the 'non-normal' algorithm for intersequencing will be left for future research.

Table 8 shows that in isolects -2, -4, and -6 the output [a] has been generated for input /ū/ before it has been generated for input /ī/. This could be provided for in rule 21 by generalizing the next variable input feature, [u grave], to [m grave] according to Principle 9a. Principle 10b would then ensure that, after an interim, the [m grave] input, /ū/, would be affected prior to /ī/ in the wave spreading from the latter origin.

Besides the treatment of /ī ū/ found in the North of England--and the oldest speakers on Martha's Vineyard (Labov 1972a)--there are several other important treatments of the inputs, differing chiefly in the environment of the rule. In the standard pronunciation of English in Scotland at the time of the first World War, many speakers (Grant 1914:63) had the second-stage or /a^{e}/ output of /ī/ only before /#r z ð v#/ and #; contrast tide ['tha^{i}d] with tie#d ['tha^{e}d]. This suggests that the boundary feature at the beginning of the environment in rule 21 should have been some other feature defined so that the value denoting a syllabic boundary could generalize to the value denoting an internal word boundary. Grant says that a syllabic boundary following the nucleus favors /a^{e}/. And apparently /$ə^{u}$/ is not heard in the variety of speech described by Grant, which shows that the [m grave] input has accelerated ahead of the [u grave] input, according to Principle 10b. What is to be said of the non-lateral continuants environing the Scots form of rule 21? Evidently there are two possibilities: (1) The original panlectal form of the rule had the

appropriate features, but very lightly-weighted originally, and then these were reweighted to greater importance in Scots. While the North of England data do not offer the required evidence, the similar pattern among older speakers on Martha's Vineyard (Labov 1972a: 122) does show light fricatives less favorable to /ə^{i}/-- and therefore more favorable to the later output, /a^{i}/-- than stops are. (2) One can easily envision a paradigmatic generalization of a word boundary from die to died. In fact Grant points out that the variety of English being described sometimes had ['wə^{i}vz] as the result of leveling the pronunciation of wives to that of wife. This last example does not, of course, involve a boundary, but the kind of generalization involved is the same as in die and died.

This problematic lect will not be dealt with further here, but rather our attention will be turned to some lects that seem related to it. In various areas of New York State, Pennsylvania, and Virginia (and probably elsewhere), there are speakers that have /a^{e} a^{o}/ in bribe, ride, loud, down and elsewhere when the environing consonant is immediately followed by #, as in briber, rider; contrast /ə^{i}/ in fiber, cider, spider. (Note here that it is a # following the environing consonant that is important, and not just simply a # preceding it, as in the Scottish speech described above.) The rate of environments is: oxytones with environing light consonants other than "g" are fastest; paroxytones with # intervening before the unaccented syllable that follows are next; and paroxytones without # following the environing light consonant are slowest. This is just the opposite of what was found in the North of England, where Friday is a faster environment than died and flies. The influence of the # following the environing consonant is attributable to a paradigmatic generalization often found in language. The priority of the change in bribe and ride over fiber, cider, and spider might conceivably be explained thus: Let us assume that the original (panlectal) rule had [m = ↕ rhythmic length] instead of [⊂ rhythmic length] in the input. Now, if this has already generalized to [α rhythmic length] in the lects under consideration, Principle 10b would dictate the priority of [M = ↑ rhythmic length] inputs. Unfortunately, there is no concrete evidence of [α rhythmic length] in these lects.[5]

Labov's (1972) spectrographic data show a change from a pattern similar to that of the North of England among the oldest speakers on Martha's Vineyard to a pattern similar to what is found in the Southern States (including most of the Tidewater areas) among younger speakers in Martha's Vineyard. Here [voiced] has become the heaviest-weighted feature, while [rhythmic length] has only vestigial importance.[6] Both [u grave] and [m grave] inputs, i.e. /ī/ and /ū/, are affected by the rule, now formulated as 22. This rule has evolved naturally out of 21 simply by reweighting [voiced]. For reasons that go beyond the present state of knowledge on the subject, the [m grave] inputs have not accelerated ahead of the [u grave] inputs, according to Principle 10b. (See below, however, for the acceleration in nineteenth-century England.) There is some question as to whether the final change--of /a^e a^o/ to /a^a/ = [a]--is part of the rule or some other, since the fastest environment in the Southern States, as in Southern England, is before the back-vowel satellites /ɫ ɚ ə/, as in tile, tire, owl, hour (see Fig. 11).[7] This contrasts with the fact that the velar environment (e.g. tiger) is the last light-consonant environment to be affected by the rule. It may be that the change of rules 21 and 22 actually began in the environments preceding satellites derived from the underlying liquids, and then spread as a crazy-rule generalization to other environments. One can provide for the early change before these satellites by adding [⊃ nuclear] as the heaviest-weighted feature in the segmental environment (cf. also Labov 1972a:122). If this feature belongs in the Southern States rule, rule 22, it also belongs in rule 21.

Since rule 22 is related to rule 21 by natural developments, speakers of at least these varieties of English presumably have the panlectal rule in their competence. It remains to be tested whether users of English in the North of England understand those in the Southern States more readily than the reverse. But in view of the fact that speakers of different lects of English (other than more or less recent creoles) communicate with one another after a brief acclimatization, it would defy common sense to inveigh against a unified grammar generating the lectal variants under discussion. Idiolectal formulations would militate

against the communicative fact that we deal with and know a lot more of our language than the small parts of it that we produce in our manifold styles.

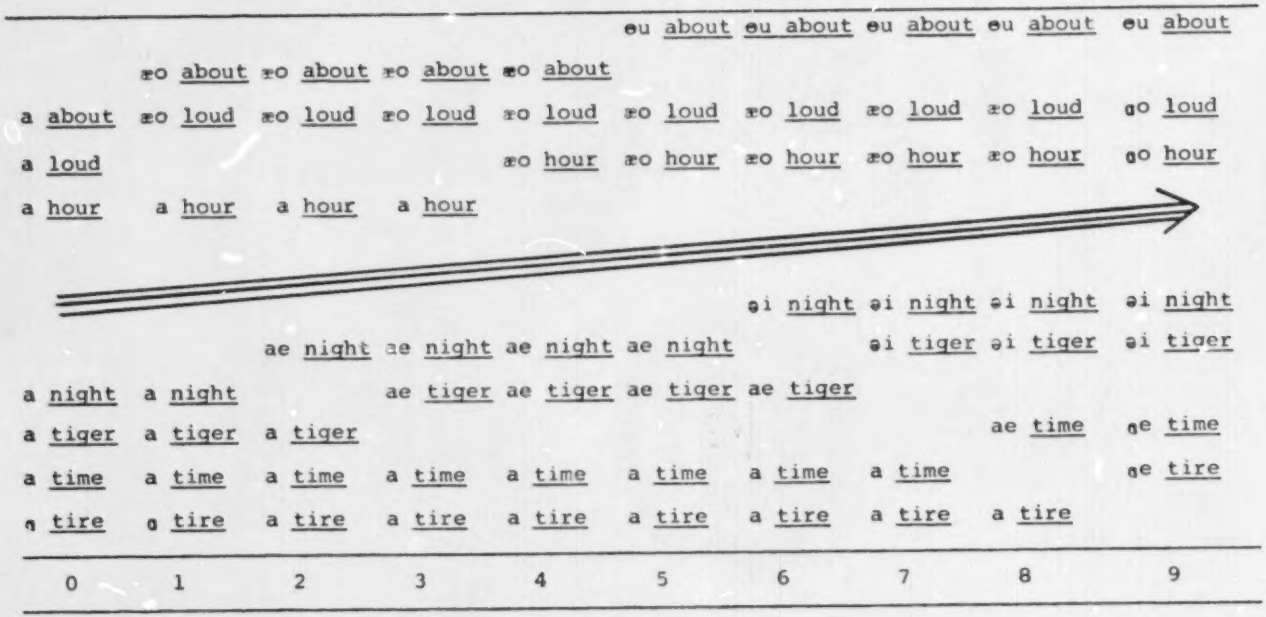
(22)
$$\begin{bmatrix} V \\ m\ \text{pharyg. wid.} \\ m\ \text{low} \\ 4\subset\ \text{rhythmic length} \\ (\text{u grave}) \end{bmatrix} \rightarrow \begin{bmatrix} \subset\ \text{low} \\ M\ \text{grave} \end{bmatrix} \begin{bmatrix} \text{u nuclear} \\ \subset\ \text{low} \end{bmatrix} /$$

$$\_\_\ (\lceil *m\ \text{segmental} \rceil) \left(\begin{bmatrix} 1\supset\ \text{nuclear} \\ 2\supset\ \text{voiced} \\ 3\subset\ \text{lingual} \end{bmatrix} \right)$$

Condition 1: At least one parenthesized element must be present in the environment.

Condition 2: $R_{\text{output peak}} > R_{\text{output satellite}}$ until the stage $/a^a/ = [\text{ɐ}]$ has been reached.

Condition 3: In the Southern States, no input is unchanged; in the Tidewater areas, the stage $/a^a/$ has only been reached in allegro styles before satellites.


əu about əu about əu about əu about əu about
æo about æo about æo about æo about
a about æo loud æo loud æo loud æo loud æo loud æo loud æo loud æo loud ɑo loud
a loud æo hour æo hour æo hour æo hour æo hour ɑo hour
a hour a hour a hour a hour
əi night əi night əi night əi night
ae night ae night ae night ae night əi tiger əi tiger əi tiger
a night a night ae tiger ae tiger ae tiger ae tiger
a tiger a tiger a tiger ae time ɑe time
a time a time a time a time a time a time a time a time ɑe tire
ɑ tire ɑ tire a tire a tire a tire a tire a tire a tire a tire
0 1 2 3 4 5 6 7 8 9

0 - Unattested? 1 - Substandard general. 2 - Semistandard general. 3 - Standard general.
4 - Standard Deep South. 5 - Richmond, Alexandria. 6 - Fredricksburg, Lexington,
7 - Raleigh, Columbia. 8 - Norfolk, Wilmington; with ɑ: Beaufort. 9 - Charleston.

Fig. 11. Isolects for /Ī ū/ in the Southern States.

In Fig. 11, tile is like tire; try, like time; hike, like night; fowl, like hour; and cow, like loud. Since the wave is spreading from its origin in the direction of the arrow, the temporal developments are to be read in the opposite direction, from right to left toward the origin.

Fig. 11 shows that the algorithm for intersequencing input changes, output differences, and environment differences is extremely complex. Isolects 3 and 4 are created by changes on the input /ɑ̄/, while the other isolects are created by changes on the input /ī/. Isolects 4, 5, and 6 are created by changes yielding a diphthong with a low-vowel peak, but the other isolects are created by changes resulting in the satellite-less nuclear output [a]. And assuming the correctness of Fig. 11, isolects 3 and 8 are created by the rule's operation in the heaviest environment, viz. before /⌐ ⁺/; only isolect 7 shows the effects of the next-heaviest environment, viz. a word boundary or an underlying voiced non-velar segment; isolects 2 and 6 are generated in the environment formed by a following /g/; and the lightest environment, the one where an underlying voiceless obstruent follows, is operative in creating isolects 1, 4, and 5.

Other developments of rule 21 can be summarized briefly. In the Midwestern and Western States, as well as in British RP, the outputs [a^e a^o] (with retracted or raised peak vowel in some regions) appear in almost all environments. In other words, the environment has been almost completely generalized, i.e. eliminated. However, the change of /a^e a^o/ to /a^a/ = [a] occurs among some Midwesterners and many Southern Englishmen before the satellites /⁺ ɚ ə/. Jones (1964:106-107, 110-111) cites British RP reductions in the environments in fire, hire, society, violin, trial, power, our, towel, and vowel, but excludes the reductions (at least in moderate tempo) in high#er, dy#er, plough#er, allow-#able, allow#ance, and (exceptionally) in coward. One should also note the evidence (cited in Chomsky and Halle 1968:284) that in the early nineteenth century in Southern England the output of the [m grave] input had accelerated ahead of that of the [u grave] input, exactly as Principle 10b specifies, since /a^o/ existed in the faster environments while /a^e/ did not yet exist.

Two summarizing remarks can conclude this section.

Despite differences among Southerners in the United States and despite the differences in outputs and conditions on the operation of the rule diphthongizing (and monophthongizing again) the outputs of underlying /ī ū/ which have to be specified between Southerners and North Englanders and Midwesterners in America, all the patterns can be reduced to a single panlectal rule, though not without different algorithms here and there for intersequencing the effects of different parts of the rule. This makes a panlectal grammar feasible, for these data are as complex as any to be met within a language which indeed possesses (at least in some lects) a supercomplex phonology.

The other part of this summary involves dialect geography. First, it is obvious that Table 8 tells us more about the language than Fig. 10, which only portrays chaos. Nevertheless, the kind of mapping illustrated in Fig. 10 greatly mitigates the greater chaos of older isoglossic approaches. It also, in combination with a table like Table 8, has the great advantage of permitting us to locate the origin of a wave of change, i.e. by locating the home of the isolect with the greatest developments.[7,8] The fact that in the Southern States the wave of changes to /a/ in the faster environments (and from /ɐ^{1} ɐ^{u}/ to /a^{e} a^{o}/ in the slower ones) is located well inland from the Atlantic Coast and has 'backed up' toward the coast indicates that the direction of this change has been in the opposite direction from the direction of migration (from the coast inland). This makes the emphasis on migration routes in previous dialect studies of questionable value. Incidentally, the High-German consonant shift, which spread northward from the South, moved in a direction opposed to that of migration. One does not yet know just how general this phenomenon is.

The writer hopes to have demonstrated the validity of his claim that the study of variation has a lot to contribute to linguistic theory and to have substantiated the feasibility of polylectal formulations. In place of dialectology, now on the periphery of theoretical linguistics, the writer would put lectology in the center of linguistics and insist that it perform the job that dialectology was originally charged with many years ago, viz. to tell us how language works.

4.3 Overlapping waves. The first proposal of a wave theory was by Schmidt (1872). Though lacking a wave model, Schmidt's evidence for waves and against family trees was conclusive and reads fresh today. His other works indicate that he ranks with Saussure as a systematizer, far surpassing the theoretical talents of the German Neogrammarians. From now on, linguists will surely rank Schmidt and Schuchardt above the latter when it comes to theory. What one finds in a so-called family tree of, say, Indo-European is a group of language systems each containing some proportion of Indo-European ingredients--much less for Tokharian and Albanian than for Greek and Sanskrit, with other languages ranged on a scale between these poles. Each such system contains another proportion, greater as the Indo-European proportion is lesser, of ingredients from other, non-Indo-European ancestors. The view already expressed earlier is that natural changes caused by children acquiring a language--unmarking, generalization--will never create a new system. This is created by heterosystematic mixture. Thus, every legitimate node (every node representing a new system) on a so-called family tree must have two or more parents.

Mixture among the lects of a system is always present, and probably only rarely absent among language systems. Mixture, lexical and otherwise, between Old English and French (itself filtered from Latin through Keltic, Frankish, and Norse) produced Middle English. How thorough-going this was may be discerned from three formatives which are Germanic in form but Romance in function: wh-relatives, -ly adverbs, and -ing progressives (see further Bailey 1973a). And today we witness 'foreign' formations like denominative adverbs in -wise. (These were hardly modeled on English forms like otherwise, which are de-adjectivals.) What makes English so adaptable as a world language is its continuing adaptability to creolization.

Table 8 has already shown the interaction of two parts of the same rule propagated as waves from earlier and later points of origin. Schmidt 1872 made it clear that language systems show the effects of overlapping waves, at least on the lexical level. Whatever is said now about the effects of competing waves is of course speculative, in view of the lack of the requisite factual data. Fig. 12 gives an idealized scheme of the overlapping of competing waves. The symbol 1 represents the

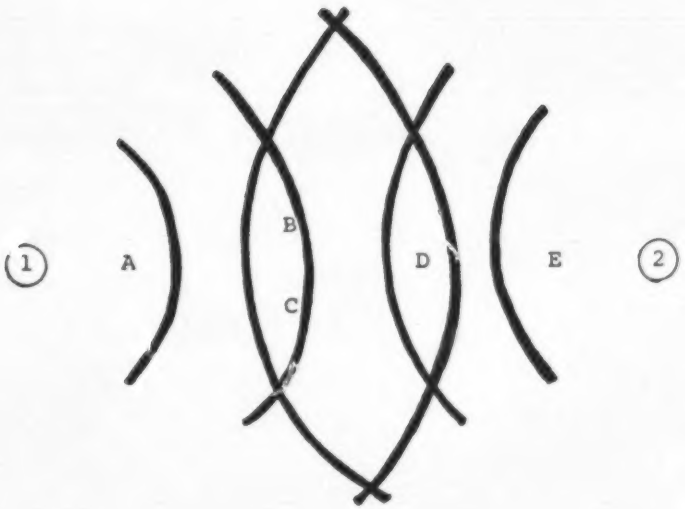


Fig. 12. Idealized Scheme of the Manner in which Competing Waves Overlap.

origin of rule 1; and 2, the origin of rule 2. The marked ordering of the rules has 1 prior to 2. The idealization assumes that the rate of propagation of the two rules through social space is the same. The capital letters designate different lects. Lect E possesses only rule 2, and lect A possesses only rule 1. The other lects have both rules. In lect B rule 2 arrives after rule 1; the result is the marked order, 1, 2. It is just the opposite in lect D, where the unmarked order, 2, 1, obtains. Lect C stems from B by way of a reordering of the rules to their unmarked order, 2, 1. Thus lect C is just like lect D, though the reasons are different for the ordering in the two lects. Presumably a lect *F would be impossible if it involved changing the unmarked rule order of lect E to a marked one, since this violates Principle 1a.

It is obvious that differences in the rate of propagation of the two waves would have to be taken into consideration in a real-life situation. Whatever differences may exist between the interaction of

tautosystematic rules and heterosystematic rules are of course unknown. But given the normality of creolization in language, the matter requires further exploration by variationists who are expert in creolization. In the end, it might be possible to clear up the vexed questions concerning a possible Balto-Slavic, Italo-Keltic, or other proto-language.

4.4 Algorithms for converting unilinear implicational patterns into multidimensional sociolinguistic patterns in a speech community. The panlectal rules of a language community generate various patterns which are handled differently in the speech communities defined by such treatments of the patterns. Where Labov defines a speech community "as a group of people who share a common set of norms about language" (cf. fn. 63), I would rather characterize it in terms of the evaluations (the feature is [favored]) and the sociolinguistic algorithms which assign the unilinear series of implicational outputs of a variable rule to sets characterized by different social parameters. And in fact Labov's (1973:59) most recent published view is that "the crucial issue for pan-dialectal grammars is not understanding or evaluation, but prediction."

The present discussion presupposes that rules have features. A language-community rule feature might be [↑ tempo] or something similar, to indicate that the rule operates more often as the tempo increases. A speech-community feature is [favored]. In a given speech community a [- favored] rule is inhibited in more monitored styles, while the same rule would be preferred in monitored styles in speech communities where it is marked [+ favored]. Non-variable rules are [x favored], i.e. neither favored nor disfavored.

Before discussing the sociolinguistic algorithms, it may be helpful to illustrate with a simple example what is involved. Fig. 13 shows the wave-like spread (cf. Fig. 14) of a series of four implicationally arranged outputs of a variable rule across a bidimensional matrix from one relative time to another. The small letters denote progressively later environments, as well as those implied by them according to Principle 14 (not all of which will necessarily still be variable). The small Roman numerals stand for relative time steps. The capital letters and the capital Roman numerals may

Time 0 A B C D	i A B C D	ii A B C D	iii A B C D
IV - - - -	- - - -	- - - -	a - - -
III - - - -	- - - -	a - - -	b a - -
II - - - -	a - - -	b a - -	c b a -
I - - - -	- - - -	a - - -	b a - -
Time iv A B C D	**v A B C D**	**vi A B C D**	**vii A ß C D**
IV b a - -	c b a -	d c b a	+ d c b
III c b a -	d c b -!	+ d c -!	+ + d a!
II d c b a	+ d c b	+ + d c	+ + + d
I c b a -	d c b a	+ d c b	+ + d c
Time viii A B C D	**ix A B C D**	**x A B C D**	**xi A B C D**
IV + + d c	+ + + d	+ + + +	+ + + +
III + + + b!	+ + + c!	+ + + d!	+ + + +
II + + + +	+ + + +	+ + + +	+ + + +
I + + + +	+ + + +	+ + + +	+ + + +

Fig. 13. Covariation of Two Social Parameters in the Temporal Development of a Disfavored Change that Begins in the II-A Cell of Matrix i. (The exclamation point is explained in algorithm 5 below.)

stand for steps on any two social or stylistic scales whose steps are coordinated with relative time steps. The parameter represented by I, II, III, and IV and that designated A, B, C, and D could be any sociological dimensions that serve as barriers to the spread of the wave through social space, provided that these barriers are coordinated with one relative time. The vertical dimension may represent successively higher social classes from I to IV; and the horizontal dimension may represent increasingly monitored tempo or style differences. The matrices for different relative times may also represent different points in social space (cf. Fig. 3 in §4.1). Changes may apparently originate in any segment of a social community, but until a re-evaluation (cf. the originally lower-class 'broad-a'

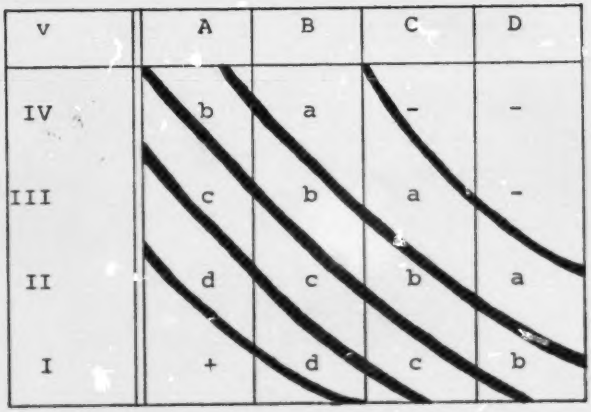


Fig. 14. The Matrix for Time v from Fig. 13, Shown as a Wave Spreading Across Social Space.

in England) occurs, changes originating in the lower or lower-middle class are normally [- favored], while those originating in the upper class are [+ favored]. A [x favored] change is one that is not evaluated; this includes some variable rules. Only variable rules are amenable to the sociolinguistic algorithms to be presented below, although categorical rules may differentiate social classes as well as any other. A point to be noted in connection with the evaluation of a linguistic phenomenon as favored (prestigious) or disfavored (stigmatized) is that group solidarity may cause a [- favored] feature of language to become [+ favored] in certain social situations, and conversely. Differences in future aspiration may have a like effect on [favored]. This effect may be so great that friends of the same social class going to the same school on Martha's Vineyard or in Silver Spring, Maryland, may grow up with different 'accents'. Of the two kinds of linguistic changes, the kind that begin in unmonitored speech (perhaps first as slips of the tongue) may be favored or disfavored, but most of those that begin in monitored speech (over-corrections) will probably be favored changes, though pronouncing the 'w' in sword or answer, the 't' in often or soften, and similar spelling

pronunciations are likely to be viewed as simple ignorance. Note that the 'ng' in the gerund is viewed by the middle classes as much superior to 'dropping the 'g''.

Variable linguistic data will fit a table like one of the matrixes in Fig. 13 if the social dimensions which are selected are ones that covary with time steps. This usually has to be ascertained for a given rule by trial and error. Thus, Labov (1966: 279) found that differences in the 'social class', constituted of occupational and educational factors, made the best fit in his study of variation in the pronunciation of the initial consonants of thin and then. Other class differences fit other situations better, including hereditary status, ethnic, religious, and economic differences. Thus, Labov found ethnic correlations in his study of the raising of /ǣ/ and /ɔ̄/. The best fit for 'r-ful' variation in New York City was obtained with the 'socio-economic class', including salary, occupational, and educational factors. The statistics that resulted from the 'r-ful' study are shown here as Table 9, where four 'styles' are shown to covary with the socio-economic class. Table 9 differs from Fig 13 in two ways. The statistics do not represent separate linguistic environments (like a, b, c, and d in Fig. 13), but all environments. Further, it is a [+ favored] phenomenon that is shown in Table 9. It originates in the upper right-hand corner.

In Table 9, the numbers on the left designate successively higher socio-economic classes, while the capital letters designate successively more formal or more monitored styles. The data are from Labov 1966:221; the cross-over of the second highest class is not shown in this arrangement of the data. The differences between the average statistic of each wave are greater at the lower left than elsewhere, thus confirming the ∫-curve stipulated by Principle 17.

The knowledge about his language which a language-user must possess in order to interpret or produce speech in accord with the statistics of Table 9 consists of Principles 14 and 20 and knowledge of whether the phenomenon is favored or disfavored. This last may have to await the end of adolescence for full attainment. Although the ages of 12±1 and 18±1 are linguistic turning points in our culture, many age factors are only

Table 9.	Percentages of inhibition of the desulcalization rule, shown as a wave spreading across the style-class matrix.				
Styles:	A	B	C	D	D'
Classes:					
6-9	12.5	25.0	29.0	55.0	70.0
3-5	4.0	12.5	21.0	35.0	55.0
0-2	2.5	10.5	14.5	23.5	49.5

accidentally relevant to a given variable rule. The age of 40 in Labov's study of 'r-fulness' in New York City was quite arbitrary. It took into account the time of World War II and of the influx of Midwesterners into New York City in managerial positions in great numbers. The difference between male and female or between urban and city-dweller can often be fitted into matrixes like those we have been looking at as relevant social dimensions that covary with time differences in the data. Factors affecting style other than tempo and familiarity are status and topic differences. Many of these have been investigated.

It has to be assumed that each band of the wave in Table 9 is a separate isolect. So important statistical differences are to be regarded as a kind of minimal difference delimiting isolects. It has relevance to the author's definition of a speech community, that different bands in a statistical matrix should constitute different isolects; and the sociolinguistic algorithms as such are relevant to the concept.

The division of the socio-economic classes in Table 9 obliterates the cross-over of the second highest class which Labov has stressed so often. Another class division with six strata (Labov 1966:240) yields the cross-over. It is provided for in the algorithms given later.

Table 10. Percentages of deletion of the lateral consonant for four groups of four Montrealers; from Sankoff MS, Table 2.

	Professionals		Working Class	
	Women	Men	Women	Men
il (impersonal)	94.7	98.5	100.0	[99.4]
ils	67.7	88.4	100.0	100.0
il (personal)	54.0	[90.0]	100.0	100.0
elle	29.8	[29.7]	74.6	96.4
les (pronoun)	16.0	25.0	50.0	78.1
la (article)	3.8	15.7	44.7	49.2
la (pronoun)	0.0	[28.5]	33.3	[50.0]
les (article)	[5.4]	13.1	21.7	34.6

Table 10 differs from Table 9 in portraying three, rather than two, sociolinguistic dimensions. Discrepant figures are placed in square brackets. The clearly discernible wave spreading across the table has not been drawn in here. Note, as in Table 9, that the statistics are more bunched in the bottom and top percentages and more spread out towards the middle percentages; i.e. the differences between the average figures of the wave bands are less in the lower left and upper right corners than in the middle of the table. Even greater numbers have been used (e.g. Labov et al. 1968:i, 149) than are used in Table 10. The difficulties in portraying larger numbers of social and linguistic dimensions in rule variation shows the need for algorithms that will convert a unilinear series like $\underline{e} \supset \underline{d} \supset \underline{c} \supset \underline{b} \supset \underline{a}$ or $\underline{a} > \underline{b} > \underline{c} > \underline{d} > \underline{e}$ into such multidimensional matrixes. These are easy enough to formulate, given a knowledge of the relevant points on the scale of each dimension which covary with time steps. They are purely relative, assuming we are already at a point in a unilinear implicational series--defined for a given set of sociolinguistic characteristics--and wish to know where in that series some other set of sociolinguistic characteristics would be.

In the sociolinguistic algorithms that follow, alpha indicates either plus or minus (but only one or the other throughout the formula). The value +1 isolect indicates a move to one isolect or band in a statistical wave which is temporally more distant from the origin. Conversely, -1 isolect denotes a change to one isolect or band in a statistical wave which is temporally nearer the origin. The accumulation of several differences will result in several steps (forwards, backwards, or both) in time. See the example given below.

1. Move α1 isolect for α1 younger relevant age grouping, and -α1 isolect for each older one.

2. Move α1 isolect for [α female] sex of speaker. Rules in other cultures, and perhaps even some in our culture, will require [α male] for the algorithm to operate correctly.

3. Move +1 isolect for each class farther from the class in which the change originated. (See also algorithm 5.)

4a. If the change is [+ favored], move +1 isolect for each more monitored style and -1 isolect for each less monitored style.

4b. If the change is [- favored], move -1 isolect for each more monitored style and +1 isolect for each less monitored style.

Note that degrees of formality (<u>styles</u>, effected by different values of [monitored], which is probably a gradient feature; see fn. 54) are varieties of <u>social distance</u>, no less than class, age, and sex differences. Since a [+ favored] change first enters the speech of a given set of social parameters in its most monitored style--and conversely for [- favored] changes, which enter in the least monitored style--we do not get the picture of a fully developed wave (as in Fig. 13) until the change has spread through all the styles. At first we will find breaks (see Table 11), as the change affects only one, or at least not all, of the styles in the speech of a typical speaker of a defined set of social traits. Note that the sociolinguistic algorithms operate only for typical speakers, since socially deviant individuals may well speak the lect of some other social group. Note also that it is society, not a string of rule outputs, that is multidimensional--the argument against using social factors in rules.

Table 11. Portrayal of the spread of a [+ favored] change having two environments in two styles, three age groupings, and three classes. (The change commences in the monitored (M) style of each group and later spreads to the unmonitored (U) style.)

Age group:	Grandparent		Parent		Grandchild	
Styles:	U	M	U	M	U	M
Upper class	-	a	a	b	b	+
Middle class	-	-	-	a	a	b
Lower class	-	-	-	-	-	a

5. The cross-over of the second-highest class.[7,8] In this class, for [α favored] changes, move α2 isolects in changing from a non-reading style to an adjacent reading style, and -α2 isolects in changing from a reading style to an adjacent non-reading style. See Fig. 13.

It has already been noted that considerations of group solidarity or future aspirations may reverse the coefficient of the feature [favored]. Note that the move is 0 isolect if the feature for a difference is [x favored], i.e. neither favored nor disfavored.

Let us suppose that a speaker is a female of the lower-middle class using style C, and that we know where she stands on the scale. To ascertain where a male in the next older age grouping and the next higher class would be for a [+ favored] change, we simply move toward the origin one isolect each for his maleness and his older age and then one isolect away from the origin for his class. After these three isolectal steps we would then move two away from the origin if the older male were speaking in style D.

If in place of the dimension represented by the values of the feature [favored], we substitute an acrolect, a mesolect, and a basilect in a decreolizing gradatum, we find the interesting nature of polysystematic mixture exhibited in Table 12. This mixture is

Table 12. Pattern of mixture in a decreolizing gradatum.

		The Language Community (Natural changes)			
Linguistic Environments:		a	b	c	d
A Speech Community (Learned differences)	ACROLECTAL SYSTEM Z is a [- favored] item.	Z Z Z Z	Ø Z Z Z	Ø Ø Z Z	Ø Ø Ø Z
	MESOLECTAL GRADATUM Y is peculiar to the mesolects.	Y,Z Y X,Y X X X	Z Y,Z Y X,Y X X	Z Z Y,Z Y X,Y X	Z Z Z Y,Z Y X,Y
	BASILECT X is a basilectal item.	X	X	X	X

not random, but is governed by an algorithm that requires the order of items in the social (vertical) dimension to be preserved in the linguistic (horizontal) dimension. In some gradatums X,Y,Z might be found in place of Y standing alone in a given environment in the mesolects. If Z in the acrolect is a [+ favored] item, the pattern will be different. For data illustrating the implicational nature of such mixtures, cf. Bickerton MS. What is relevant to the present discussion is that the mixture accords with the patterns generated by a wave model; and therefore sociolinguistic algorithms similar to those discussed above are applicable also in situations where polysystematic mixture is involved. What the interrelations of different types of phenomena in the overall pattern might be is something too complex to consider at the present time. It will be a fertile field for future investigation.

APPENDIX: FEATURE MARKING & WEIGHTING

In the view of the present writer, phonetic markings depend on the position of a segment in a syllable. This approach is syllable-sensitive or syllable-dependent and therefore different from most views which have been put forward heretofore.

Sources for ascertaining which feature values are unmarked (u), marked (m), or overmarked (M) include rule changes (of the sort that do not involve higher-level unmarkings and may result in increased feature-marking), implicational distributions among languages of the world, and--where the evidence is clear and accordant with the foregoing--the order in which children in their post-babbling stage of language acquisition acquire the features of a language system (the marked being later than the unmarked). There may be in addition considerations of physiological production of sounds or of acoustical similarities and differences. Before giving the details of feature markings, the ternary-valued features accepted in the present writing may be listed as follows:

1. [pulmonic]
   - \+ pulmonic air source, always u
   - x glottal air source, always m
   - \- velaric or palatar air source, always M
2. [egressive]
   - \+ egressive air stream, always u
   - x both egressive and ingressive (some labial-velars), always M
   - \- ingressive, always m
3. [voiced]
   - \+ voiced, u for non-obstruents, m for obstruents
   - x voiceless, m for non-obstruents, u for obstruents
   - \- aspirated, always M

Kim (1970) has proposed that the voicing feature is

really a feature denoting the size of the glottal opening. (I would have used the feature name [glottal opening], except that [voiced] has come to be too well-known to make it worthwhile to substitute a new term.)

4. [pharyngeal widening]
   + wider pharynx, u for vowels in open syllables (see fn. 60) and sonorant consonants, m for vowels in closed syllables and for obstruents
   x neutral, u for vowels in closed syllable; but m for vowels in open syllables and for sonorant consonants, u for obstruents
   - narrowed pharynx (pharyngealization), always M

   Because of a resyllabication that occurs in English between the first bloc of rules and the greater number of rules that follow (Bailey MSb, MSc), English surface phonetics have an expectation of [+ pharyngeal] vowels in open and in loosely closed syllables (those closed with only a weak cluster not followed by two weakly accented syllables in the word) and [x pharyngeal] vowels in tightly closed syllables (those closed because of a heavy cluster following the nucleus or because of two following unaccented syllables). These facts suggest that perhaps [length increment] (see feature no. 25 below) would be a more appropriate feature than [pharyngeal width]; but fn. 73 shows that there is a difference between nuclear decrements due to following heavy obstruents and nuclear shortening due to following unaccented syllables. (In an accent-timed language like English, an accented syllable has to be shorter when unaccented syllables intervene before the next accented syllable and perceptually are more so as more unaccented syllables follow.) As for consonants, it is believed that [pharyngeal width] is the cause of differences in air pressure, so that a feature [air pressure] is not required.

5. [thyroid]
   + raised larynx, always M
   x neutral, marking values as for [x pharyngeal]
   - lowered, marking values as for [+ pharyngeal]

6. [laryngeal]
   + creaky voice, always M
   x murmured (breathy voice), always m
   - no laryngealization, always u

7. [whisper]
   + stage whisper, always M
   x plain whisper, always m
   - unwhispered, always u
8. [nuclear]
   + syllabic peak (see discussion of values below)
   x satellite of compound nucleus (unsyllabic nuclear)
   - non-nuclear
9. [turbulent]
   + obstruents (see discussion of values below)
   x semiturbulent or deflected air stream: sonorants
   - non-turbulent: low and mid accented vowels
10. [continuant]
   + continuants: fricatives and liquids other than taps (see discussion of values below)
   x semicontinuants (non-steady-state continuants and semi-stops): glides, the glottal stop, taps, nasal sonorants[ao]
   - occlusives (including [^{n}d t^{s} t^{l} t^{h}], but not [$^{d}\mathrm{r}$])
11. [released]
   The value of this feature for consonantal and nuclear diphthongs is unclear; see below.
12. [nasal]
   + fully nasalized (see discussion of values below)
   x partially nasalized, always M (found in Chinantec and in those kinds of English that distinguish <u>apple</u> from <u>ample</u> as [x nasal] and [+ nasal], respectively).
   - non-nasal

   Perhaps a feature, [air pressure], will also be needed.
13. [liquid]
   + lateral (see discussion of values below)
   x grooved (see [sulcal] below)
   - undeflected oral air stream
14. [sulcal]
   + narrow-grooved, u for sibilants (- nuc, + trb, + cnt, = sul) in non-special positions (see below), m for sibilants in special positions, M otherwise

x wide-grooved, u for high vowels and sibilants in special positions (as in Portuguese lects and Swiss German), m otherwise
- non-sulcal, u for non-high vowels and non-sibilants, M for sibilants

15. [vibrant]
+ trilled (see discussion of values below, and also see [release])
x tapped or flapped
- non-vibrant

16. [grave]
+ back rounded vowels and labial(ized) velars, rounded labials (including [w]), and velarized apicals or labials (see discussion of consonantal values below); always m for accented vowels and M for unaccented vowels
x central and back unrounded vowels and unrounded velar, postvelar, and labial consonants; always M for accented vowels and u for unaccented vowels
- front vowels and apical and palatal consonants; always u for accented vowels and m for unaccented vowels.

Since this feature does not distinguish unrounded back and central vowels, [+ grave] may have to be made to include all back vowels. See Figs. 15 and 16.

17. [lingual]
+ dorsal or rhyzolingual (see discussion of values below)
x apical
- labial

18. [low]
+ low vowels, always u for accented and M for unaccented vowels (perhaps used for glottal consonants with m value)
x mid vowels, always M for accented vowels and u for unaccented vowels (perhaps used for uvular and labial consonants with M value)
- high vowels, always m (perhaps used for dorsal and apical consonants with u value)

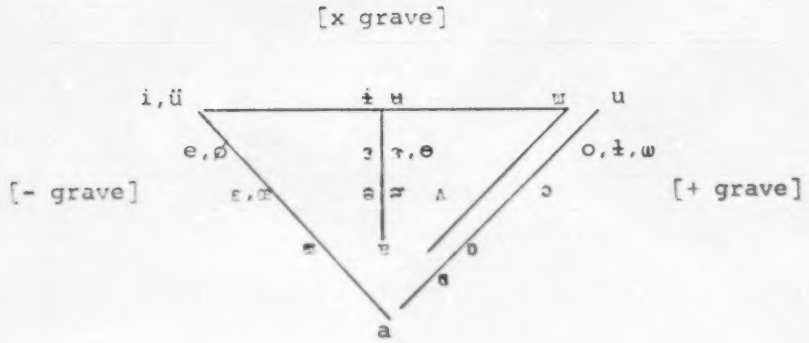


Fig. 15. Schematization of values of [grave] for vowels.

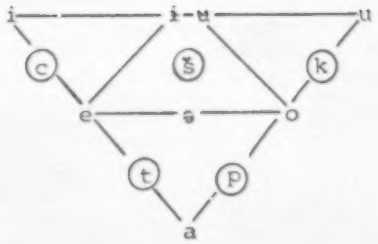


Fig. 16. Possible allocation of values of [grave] for vowels and consonants. (Because of the problems for consonants, these values have not been adopted in the system of features proposed in this writing.)

19. [dorsal]
+ convex dorsum (dorsals), u for all vowels (see discussion of values in consonants below)
x dorsum neither convex nor concave, M for vowels
- concave dorsum (retroflex articulation), m for vowels (e.g. [ɯ])
Note the following distinctions:

	[+ dor]	[x dor]	[- dor]
[+ sul]	[ʂ]	[s]	[ʂ̱]
[x sul]	[ʃ]	[š]	[ʃ̱]

20. [round]
    + over-round, in-rounded, or more-rounded, always M
    x plain rounded, u for high back bowels, [w], [r], and wide-grooved sibilants
    - unrounded, u for other vowels and consonants

    To account for the assimilation of [s] to rounding when adjacent to a labial consonant in English, [x round] might also refer to labiality, reserving [+ round] to [b^w m^w] and the like. Note that English [w] is more-rounded, as in woo, whereas classical Latin [w k^w] and earlier English [w] were [x round] and therefore swallowed up in following rounded vowels.
21. [coronal]
    + apical, u for [x lng] consonants, M for vowels and other consonants
    x laminal, m for [x lng] consonants and all sibilants, m for vowels
    - non-coronal, u for vowels, [x̄ lng] consonants
22. [dental]
    + predental or addental (values depending on foregoing), u for non-vibrants
    x alveolar (gingival), u for trills
    - neither, always u for all segments except [x lng] consonants other than trills
23. There may be a feature [peripheral], but this is not certain; it would be a purely phonetic (i.e. non-phonological feature).
24. [accent], a purely phonological feature
    + fully accented, m for vowels
    x mid-accented, M for vowels
    - accented, u for all segments
25. [length increment]
    + length increment (rules may add several such increments), M for vowels, m for consonants
    x neutral, u for all segments

- length decrement, m for vowels, M for consonants

Note that a length increment can be added to others cumulatively, as in 'r-less' bird ['bə:·d].

26. [tune increment]
    + ↑ increased pitch, loudness, and duration, u (from [+ addressee-oriented])
    x neutral, M
    - ↓ decreased pitch, loudness, and duration, m (used for foregrounding, imperatives, and compounding; foregrounding includes initial wh-elements), m (from [- addressee-oriented])

The arrows denote gradient values. The feature [rhythmic length] (no. 36) is not to be confused with [↓ tune increment].

27. [raised pitch limit]
    ↑ raised upper pitch limit, m (from [+ vivid])
    x neutral
    ↓ raised lower pitch limit, m (from [+ tentative])

28. [amplification]
    ↑ amplified ranges of pitch, loudness, and tempo (= retardation), m (from [+ high-lighted])
    x neutral, u (from [x high-lighted])
    ↓ contracted ranges of pitch, loudness, and tempo (= acceleration), M (from [- high-lighted])

29. [cadence]
    + falling unaccented syllables at end of phonological phrase, u (from [+ conclusive])
    x level, M (from [+ sinister] or [x conclusive])
    - rising, m (from [- conclusive], which is in turn generated from various features)

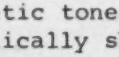
30. [jagged]
    + jagged envelope with unaccented syllables [- upper], u
    x jagged envelope with unaccented syllables [+ upper], M
    - envelope not jagged, m

This is probably a purely phonological feature, whose values are respectively derived from the force features, [+ assertive, - assertive, x assertive].

31. [smooth]
    + smooth envelope, with unaccented syllables averaged between surrounding pitches, m
    x stair-step envelope, with unaccented syllables on same pitch as preceding accented syllable, M
    - neither (i.e. jagged), u

    This feature has its values derived respectively from [- detached, + detached, x detached].

32. [kinetic]
    + bidirectional pitch gliding, M
    x unidirectional pitch gliding, m
    - unglided, u

    Kinetic tones with one vertically long and one vertically short glide (i.e. ) are to be treated as compound tones (pivoted compounds with both sides vertically long do not exist). In most languages, kinetic tones which are pivoted and have one side vertically long are compounded of unpivoted kinetic tones; but in some languages, it may be that the compound represents a [+ upper] or [- upper] pivoted tone and an unpivoted kinetic tone in the other part of the pitch range.

33. [upper]
    + upper two-fourths of pitch range, m
    x middle two-fourths of pitch range for non-glided tones, u; entire four-fourths of pitch range for gliding (kinetic) tones, M
    - lower two-fourths of pitch range, M for unglided tones, u for kinetic tones

    This feature is derived from several others; note that presupposed information is [- lower].

34. [rising-start]
    + rising-start kinetic tone, m
    x level (non-kinetic) tone, u
    - falling-start kinetic tone, M

35. [rhythm]
    + accent-timed, M
    x syllable-timed, u (often found in pidgins; cf. also fn. 24)
    - neither

36. [rhythmic length]
    ↑ gradient lengthening, M
    x no lengthening or shortening, u
    ↓ gradient shortening, m

This feature is phonetically dependent on [rhythm], but is needed in phonological rules like rule 21 above. Its marking values depend on those of [rhythm], but have not been worked out here.

37. [segmental]
  + segment (not a boundary), u
  x syllabic boundary, m
  - other boundary, M

38. [word boundary]
  + internal word boundary (#), M
  x morpheme boundary (+), m
  - neither of the foregoing, u

Before explaining features not defined above like [release], it may clarify matters to point out that phonetic [ph hp ^{n}d ^{d}ɾ̈ t^{l} d^{ž} p^{f} a^{e} ɘ^{i}] and the like may derive from phonological units or from two phonological segments. Thus, English [ʉ^{ɪ}] in <u>fluid</u> derives from /uɪ/ (cf. <u>fluidity</u>), but [a^{o}] in <u>loud</u> derives from the underlying unit /ū/. And English [d^{ž}] derives from /dy/ in <u>verdure</u> and <u>didya</u>, but from the phonological unit /g/ in <u>regent</u> (cf. <u>regal</u>). The feature [release] may be helpful for designating phonological units from which there are generated more than one phone (e.g. /^{n}d ^{d}ɾ̈ p̌/), provided onsets are distinguished from offsets. (The aspiration feature has to be used in conjuncation with [release] for /^{h}p/ and /p^{h}/.) It is assumed that nuclear peaks would have homorganic peripheral releases if marked [+ release]; e.g. /ɘ^{i} ɘ^{u}/. The mid-value could be used for in-gliding, or else to distinguish /a^{e} ɒ^{o}/ from /a^{i} ɑ^{u}/. One might respectively distinguish /^{d}ɾ̈/ from a tap from a trilled /ɾ̈/ as [x release], [- release], and [+ release], but problems are involved in this course.[81] As for /bɦ/ and the like, it is well-known that one may not use the aspiration feature; possibly such phonological segments could be designated as both murmured and aspirated, but this is unclear.

Here follows a discussion of the values of [nuc, trb, cnt, grv, lng, dor] and, as a group, [nas, liq, vib, sul]. The <u>special positions</u> mentioned below are the position following a tautosyllabic accented syllabic peak and the position preceding a tautosyllabic prevocalic consonant. Only the first of these is

relevant to [cnt], but both are relevant to the place features [grv, lng].

The values of [nuc] are [+,u nuc] for the peak, where no other value is possible; [x,u nuc] for a satellite of the peak; obstruents can only be [-,u nuc], except for those unusual cases of syllabic sibilants ([+,M nuc]). But the values of sonorants can range over all three values of [nuc], depending on the environment; hence the specification of these values is iterative. The unmarked values of [nuc] can be ascertained from the study by Bailey and Milner 1968, where they are posited for the binary feature, [syl] (syllabic). This statement depended on the evidence of Indo-European in the alternations referred to as Sievers-Edgerton's Law (not valid after the internuclear loss of the so-called laryngeals). But compare modern French, where [y] is preferred to [i] in the environment heard in rien, whereas [i] is preferred to [y] in that heard in triomphe. In English [x nuc] is grouped with [+ nuc] as [$\bar{+}$ nuc], but in PIE it was grouped with [- nuc] as [$\bar{+}$]nuc].

To understand the values of [cnt], it is necessary to begin with the syllabic peak--[+,u cnt], unless a compound nucleus or syllabic nasal ([x,m cnt]), [-,M cnt] being impossible--and work away from it in both directions. One then establishes the values for the segments preceding and following the peak; after which the values of the segments farther from the peak are relative to the next segment nearer the peak, [- cnt] alternating with [$\bar{+}$ cnt] as the unmarked situation for all consonants except in the prevocalic cluster [sn] (see fn. 83). Except for the peak and the special position immediately following it, [x cnt] is [M cnt]. The values for the segments next to the peak are:

Prenuclear:	Post-peak (special position):
[-,u cnt]	[x,u cnt]
[x,m cnt]	[+,m cnt]
[+,M cnt]	[-,M cnt]

The values of the other non-nuclear segments depend on what is found in the positions just described:

Prenuclear:		Postnuclear:	
Before [-,u cnt]:	[+,u cnt][82]	After [x,u cnt] or	
	[-,m cnt]	[+,m cnt]:	[-,u cnt]
			[+,m cnt]
Before [x,m cnt] or		After [-,M cnt]:	
[+,M cnt]:[83]	[-,u cnt]		[+,u cnt][84]
	[+,m cnt]		[-,m cnt]

The immediately preceding definitions must be applied iteratively as one proceeds away from the nuclear peak.

To understand the remaining features, it is necessary to note the expectations for the occurrence of different segments in different environments, but especially in the special position following the peak of the syllable. Here glides are more expected than nasals, nasals more than liquids, liquids more than fricatives, and fricatives more than stops. Thus, [x cnt] is [u cnt] here, [+ cnt] is [m cnt], and [- cnt] is [M cnt]; and [x trb] is [u trb], while [+ trb] is [m trb], and [- trb] is hardly possible, given the limit of one peak per syllable. Except for fricatives, where [s] is expected in all positions, velars are more expected than labials, and these more than apicals, in the special position. Thus velarized liquids and glides are preferred to others in the special position following the nucleus, but not elsewhere. Of the liquids, /r/ is preferred to the lateral everywhere (including the peak position) except at the beginning of a syllable or following [s] (note the relative rarity of /tl skl sr/), though a tap is preferred to a trill syllable-finally. (Note the change of pl, gl, etc., to pr, gr, etc., in Portuguese.) The features designating the liquids must therefore have the appropriate values to ensure these expectations. In the non-special positions, apical non-fricatives are preferred to labials, and these to velars; this accounts for the prenuclear and postnuclear matathesis of /tp/ and /tk/ in various languages. Palatals are regarded in the following markings as being, like labialized velars, unexpected segments in the special positions, except when the result of assimilation, a higher-level unmarking process. (Note the change of underlying // // to [l] in Spanish aquel.)

Non-special positions:

More expected:	Apicals:	[-,u grv, x,u lng, x,u dor]
	Labials:	[x,m grv, -,m lng, x,u dor]
	Palatals:	[-,u grv, +,M lng, +,u dor]
Less expected:	Velars:	[x,m grv, +,M lng, +,M dor]

Special positions:

More expected:	Velars:	[x,u grv, +,u lng, +,u dor]
	Labials:	[x,u grv, -,m lng, -,u dor]
	Apicals:	[-,m grv, x,M lng, -,u dor]
Less expected:	Palatals:	[-,m grv, +,M lng, +,m dor]

Note that the values of [lng] and [dor] are relative to and dependent on the heavier-weighted feature, [grv]; this is true of [lng] only in the special positions. In languages like English, where post-peak glides are [= nuc], glides ([x trb, - nas, x cnt]) are part of the nucleus and therefore unpermitted in the special positions, which may still be occupied by other sonorants, at least in the postnuclear part of the syllable. In languages where glides are [∓ nuc], the [+ grave] glide [w] is preferred in languages having only one glide in this environment, just as [- grave] [y] is preferred before the vowel in languages having only one glide in this environment. Where both glides occur as satellites, it appears that the unmarked one is [w] after back or central vowels and [y] after front vowels. Where palatals occur, laminopalatal sibilants are more expected than the pure palatals and are to be marked [x,u dor].[85] Such segments are then less marked than labials in the non-special positions--possibly indicating an incorrect feature analysis--and no more marked in the special positions than apicals. This must be left as a problem for further investigation here. (Note that the metathesis in classical Attic Greek of /ny ry/ to /^{i}n ^{i}r/ after /a o/ does not prove that palatals are preferred to apicals in the postnuclear special position, since glides are preferred to other sonorants there.) While some languages have syllable-initial [ŋ] but not [ɲ] and other languages exhibit syllable-initial [ɲ]

but not [ŋ], the only way to resolve the issue of which is preferred in this position is to assume that the velar is preferred and to set up underlying //ny// or something similar for [ɲ], ruling out palatals in all underlying representations.

The marking values for fricative obstruents have been indicated only for the sibilants thus far. Presumably, as with other consonants, labials are more expected than velars in the non-special positions, while velars are more expected than labials in the special positions. The palatal, bilabial, and interdental fricatives are rarest; the former presumably results only from the higher-level unmarking process of assimilation, while the interdental fricatives presumably arise only in the higher-level unmarking process of chain shifts. The place features have to depend on the combination of [+ trb, + cnt] and then have to be calculated for fricatives to insure the foregoing results.

Sometimes boundaries classify with consonants in rules; at other times, they classify with vowels. Some provision should be made for this in a feature system.

It is important to observe in connection with the writing of rules that the abbreviations V (vowel) and C (consonant) may sometimes abbreviate quite complex, even bracketed, environments. But the abbreviations certainly seem justified in terms of language-users' competence. As is well-known to all who have been extensively engaged in writing rules with marking feature values, some of these rules are much simpler and others are much more complex than rules utilizing absolute (plus and minus) values.

For feature-stripping and for correlations of various prosodic phenomena with unmarked rhythm and unmarked syllabification, see fn. 24. Thus, [h] is often preferred to [s] in the special position. Note that when a more marked phenomenon (e.g. a uvular trill) replaces a less marked one (e.g. an apical trill) as the result of borrowing, it is still incumbent on the linguist to posit a natural origin for the marked phenomenon. Uvular trills may be presumed to begin in the environment of segments with lowered uvula, and in fact they often begin in languages having nasal vowels (e.g. French, Portuguese); they can then spread to other

environments by a crazy-rule generalization (cf. Bach and Harms).

The reader is warned against the frequent confusion of unmarking with leveling. Maximizing feeding order, but not minimizing bleeding order, results in leveling. Mixture often results in leveling, but also, as in the preceding example, results in an increase of markedness; cf. also the borrowing of [m voiced] word-initial fricatives into Old English from French.

Besides Saussure himself, a number of scholars have discussed hierarchies of strength among features or sounds: Hoenigswald MS, Foley, 1970, Vennemann 1972a, Chen MSb, Friedrich 1971, and Zwicky 1972; cf. also Krohn 1969. Various approaches are possible to determine the relative weightings. I have mainly used reweighting changes (first discovered by Labov 1969); cf. the exposition of rule 3b in §3.1. This often converges with the results of other approaches. One is to regard features as less heavily weighted than others on whose markings their own markings depend when they are bundled together in a single segment. Feature values which are implied by others in the phonological inventories of natural languages offer a good mode of determining relative weightings, but frequency in languages of the world may be a less secure criterion. Very important is the order in which most children acquire features systematically (cf. fn. 16), i.e. after the babbling stage, especially when such facts converge with the results of the other approaches. (But note the caveat in Fromkin.) The general convergence of these approaches lends credence to the view that there is a natural physiological and/or acoustical basis for them all. But the air-stream features [nasal, voiced, continuant, lateral] are scattered throughout the hierarchy and two very assimilable features having large neuromuscular indexes in Krmpotić's (1959) calculus of nerve sizes, [voiced] and [round], differ vastly in their unmarked relative weightings in the hierarchy. This does not mean, however, that a natural basis for weighting will not be discovered. Chen MSb found a natural basis for natural rule 6a in §3.1, and the work of other scholars could be cited.

In the following hierarchical listing of the provisional unmarked relative weightings of features, a list which has been generally found serviceable, only

fifteen of the twenty-three non-prosodic features, only one of thirteen prosodic features, and only one of two boundary features are included; [accent] and [word boundary] are both non-phonetic (i.e. purely phonological) features[86] while [peripheral] (Labov 1972a:161; this feature has been included in the numbers cited in the foregoing) may be a purely phonetic feature:

17. [nuclear]
16. [accent]
15. [word boundary]
14. [turbulent]
13. [nasal]
12. [liquid]
11. [voiced]
10. [continuant]
9. [sulcal]
8. [grave]
7. [lingual]
6. [vibrant]
5. [low]
4. [dorsal]
3. [pharyngeal widening]
2. [thyroid]
1. [round]

This list will doubtless undergo further revision and expansion as the still incipient investigation of weighting progresses. Further work is required to determine whether flip-flops (like that of _stark_ and _stork_, _card_ and _cord_, etc., in some Texas lects, which exchanges _m_ and _u_ values of [round]) are amenable to Principle 1 in any way. It is worth noting that the two binary features to which any alleged ternary feature can be reduced entail different predictions about feature-weighting from those implied by a single ternary feature; the two binary features imply a difference in their relative weights which should be impossible in the case of a single ternary feature. Note further that the problem of marking the mid vowels in a binary-feature system (cf. Chen MSa) is obviated in the ternary-feature system.

Two formalisms exist for building relative weights into rules. Where the features are tautosegmental, the heavier ones may simply be written (as suggested by Bruce Fraser) above the lighter-weighted ones. Where

this notation is not possible, i.e. where the features do not belong to the same segment, numerical relative-weight operators may be employed, though without any claim that they are 'psychologically real'. What is psychologically real is the implicational arrangement which the relative heaviness and lightness of rule features generate according to Principles 9, 10, etc.

The calculus of feature weightings for a given rule environment is based on the numerical weight operators and the absolute (plus, mid, or minus) values, not the marking values, of their features.[7] (Pending further investigation, the mid value of a feature is counted as zero and that feature then has no effect on the calculus.) In the calculus in Tables 1 and 2 in §3.1, two steps are seen. First, the absolute value of a variable feature is multiplied with the numerical operator. If the feature is negative and the operator is also negative, the result is positive. The sum of such values for all variable features then constitutes the weight of that environment.

NOTES

1. Views of the sort expressed in this writing are indicated in Bailey 1972 (summarizing a presentation given in early 1969) and in Bailey 1971.
2. Bailey 1972 advocated my present views on implicational patterning, the role of time in descriptive linguistics, and transpersonal language systems. Important theoretical work of the same period or earlier is to be found in Weinreich, Labov, & Herzog 1968 and in Labov 1972a (read at the same 1969 conference when Bailey 1972 was read).
3. The manifestations of parole are "individual and momentary" and are not homogeneous (Saussure 1962: 38 = 1959:19); language gets its unity from the social phenomenon of langue (1962:27 = 1959:11). References to Saussure are given for both the 1962 French printing of the third edition and the 1959 English translation; the renderings are my own throughout.
4. I am not unaware of rejections of the distinction between competence and performance by various linguists nor of new senses of the term performance being advocated by scholars in the social sciences who deal with language. Nevertheless, it does not seem possible for any scholar seriously to include in his analysis aspects of raw linguistic data which are unsystematic and unintended such as coughing, sighing, distortions due to eating, and the like. Slips of the tongue are another matter, and may be systematically predictable with an adequate marking theory; cf. fn. 36. I hope scholars who object to the distinction between competence and performance will be disarmed by my admitted aim of making the scope of performance as exiguous as possible, inoculating it from the harm it has brought to linguistic discussions in recent years through its use as

a waste basket for problems that linguists have not wanted to face, preferring to treat them as inessential or accidental. As for newer proposals by scholars in the social disciplines to broaden the meaning of the term performance, the reader will be excused from adopting either of these because they run counter to his interest in inoculating the term from the very serious confusions which it has already occasioned. (See also fn. 36 below.)

5. Bloomfield (1933:45) admitted "that no two persons--or rather, perhaps, no one person at different times--[speaks] exactly alike".
6. A later paradox of Hockett's is discussed in Weinreich et al. 129.
7. For a strongly dissentient view, see Foley 1970; and cf. Shapiro 1972:345 fn. 6. Contrast the views of the phonetician-phonologists Ohala (1971) and Fromkin (1970). The writer's own advocacy of naturalness below should not be construed as exclusively 'physicalist', any more than his favorable comments on the empirical aspects of linguistic study should be understood as a sign of hostility toward abstract entities in the mind, explanatory hypotheses, etc.; see §2.0. It is now widely agreed that phonological changes, for example, may be semantically and syntactically environed.
8. As regards the final clause in the quotation from Chomsky 1965 cited above, many scholars would be of the opinion that a 'cogent reason' for modifying the homogeneity doctrine had in fact been already provided in Labov 1963.
9. These differences are by no means necessarily of equal probability in their occurrence in a speaker's utterances. Not only linguists, but also language-users themselves often tell us that certain usages are frequent or usual, while others are not. Indeed, they may tell us that a given phenomenon depends on (implies) the presence of some other. (Language-teachers tell students that when one calls a man Monsieur, one addresses him with the pronoun vous.)
10. Although it is styles that are spoken of in most of the literature, I prefer tempo as the more objective and quantifiable concept and one that corresponds

more intimately with the degree of monitoring of one's own speech. As Bierwisch (1966) was able to specify phrasings in terms of tempos, one can also specify relative tempos in terms of phrasing phenomena (cf. the simplification of Bierwisch's approach and its adaptation to English in Bailey MS).

11. Since I reject the term idiolect as the designation of any worthwhile notion, it is employed here purely for expository purposes.
12. The formulation of interpersonal variants in a single polylectal grammar representing language-users' internalized competence is justified below on the basis of the acquisition of language by children.
13. "...the evidence has been disappointing: an unselected set of isoglosses does not divide a territory into clear-cut areas, but rather into a crosshatched continuum of finely subdivided fragments" (Weinreich et al. 151). In rejecting the notion of dialect, Schuchardt (M-13) complained against the notion of "a completely homogeneous speech community" and against the practice of "descend[ing] to the language of the individual and specifically to its momentary average, in order to find real homogeneity..." (Cf. fn. 11 above.)
14. Various coinages like sociolect and varilect, as well as proposals to use idiom, variety, and tongue for the purposes for which I am using lect have their drawbacks. The first of these terms obscures the similarity in principle between regional and other social differences among varieties of a language. When dealing with creole continuums, it is convenient to speak of the lect which is linguistically most remote from the prestige language as the basilect; the prestige language of the area may be called the matrilect or the acrolect. Further comments on the notion of dialects is found in Bailey 1973b, where a number of implicational patterns for English are cited and the possibility of implicational patternings of lexical items is discussed.
15. The similarities between Saussure's outlook and that of E. Durkheim have led a number of scholars to attribute to Saussure a greater influence from

Durkheim than was probably the case. In contrast with Saussure's views, just quoted, to the effect that past is past and present is present, Greenberg (1966:61) sensibly maintains that "some connections between diachronic process and synchronic regularities must exist, since no change can produce a synchronically unlawful state and all synchronic states are the outcome of diachronic processes."

16. Arthur Compton (personal communication) has apprised me of some interesting aspects of a child's non-instantaneous acquisition of English sounds. At the stage when she was first investigated, the child possessed three consonants in her repertoire: [p m w]. One may assume the presence of the features [continuant] and [nasal] in her competence at this point; [w] was used for adult [r] as well as [w], so that ring sounded like wing. Then [voiced] was acquired, adding [b] to her inventory and [f] in opposition to [w]--which now got replaced with [v] as the voiced correlate of [f]. On the face of it, one might suppose that 'unlearning' the correct pronunciation of wing (now ving) after it had been correctly pronounced would be anything but optimal progress in the acquisition of language. But in a framework of non-instantaneous acquisition of features, the child described here exhibited progress (in acquiring features) at every stage.

17. An exception to the reluctance of transformationalists to admit the effects of performance on competence is Bever & Langendoen 1972, beside Kiparsky 1972:222; see also Bolinger 1962. Kiparsky 1971 attributes instances of gradual sound change to the allegedly scalar nature of phonetic features (and would presumably now attribute semantic changes to the fuzzy nature of semantic features). The speciousness of this artifice becomes apparent from the fact that the gradual raising of tense /æ/ in New York City changes the plus-minus values of two phonological features-- if they are binary.

18. A recent study maintaining the same general point of view as the writer's is Householder 1972; cf. also Bhat 1970. The primary document remains Weinreich et al.

19. See Traugott 1973 for further discussion of the place of creolization in variation studies. Elsewhere I characterize natural changes resulting from the manner in which children acquire their native languages as [+ natural]; changes due to borrowing from other systems are [x natural], where x represents the mid value of the feature; and [- natural] characterizes really unnatural developments (cf. fn. 29). Besides borrowing, other sources of increased markedness may be mentioned briefly. It is well-known that unmarking one segment may leave another marked. Since the markings are dependent on position within the syllable, according to the views of the present writer, epenthesis and deletion will greatly alter markings. See further fn. 24. Special markings also arise in order to distinguish different kinds of phenomena. Contrast the closed syllable in coyer and dualist with the open syllable (at least in 'r-less' lects) preceding an underlying sonorant not preceded by a deleted underlying vowel in Maya, lawyer, and hilly; and the rising diphthong in Fren. oui with the falling diphthong in bouille.
20. That recognition precedes production in child language has been recognized for a long while (e.g. Ervin 1964:164). It is too early to attempt answering such questions as whether rules begin variably in one's understanding competence before becoming (variable) rules in the subset of one's competence which is employed in producing speech. Because of the asymmetry between understanding and production (see §2.3), one might hypothesize that understanding is to be analyzed with binary features, while production is to be analyzed with ternary or scalar features. Such a difference is unlikely, and in any case listeners are able to scale what they hear, e.g. as more typical of a banker or telephone operator or as more typical of a ditch-digger.
21. Leveled varieties of a language exhibit the merger or neutralization of items which are unmerged in unleveled lects. The more items merged or not merged, the more leveled or unleveled the lect, respectively.
22. Since the orthodox transformationalists have

objected to polylectal grammars precisely on the grounds of psychological reality, it is paradoxical that many of them are now first to give up the requirement of psychological reality in their own work!

23. One of the most far-reaching investigations to determine how well the ideas mentioned in this paragraph stand up in the study of regional variation is being conducted by Gary J. Parker (cf. MS), who has found that a number of problems which were but artifacts of the old framework can now be easily dealt with in the new.

24. Higher-level unmarkings can overrule feature unmarkings and result in the marking of previously unmarked features. See Principal 1b in §3.0. (Parker & Bailey 1970 suggest writing m upside-down, i.e. as w, in such instances to show that the new value is a natural one.) These higher-level unmarkings include assimilation, dissimilation, rule-reordering, chain shifts, crazy rules, and perhaps others (e.g. flip-flops? See also Vennemann's [1972b:240] typological adjustment rules for the principle of symmetry). See also the discussion following rule 21 in this book, where the compromise of two opposite values may result in an M (overmarked) value. Polarization can easily be illustrated with Hawaiian. When k became a glottal stop in this language, t changed to k to become maximally different from the only other stop remaining--p. Since t is unmarked for place of articulation in the syllable-initial position (see the Appendix), this change represents a change of [u lingual, u grave] to [w lingual, w grave]. Alternating accents represent a polarization of maximal oppositions. The relation between marking and chain shifts will be taken up again below; such phenomena include the changes formalized with the implicational ($\supset$ and $\subset$) coefficients discussed below. Metathesis, epenthesis, and deletion often change marked feature values to unmarked ones, and may change the syllabication, accentual, and rythmic patterns of a language. Note that unmarking one feature may leave another marked. Intimately connected with marking, but little understood (see, however, Schane 1972:211, where the changes in

question fall under the rubric of polarization), is what the writer calls feature-stripping. This process deletes oral articulations for voiceless or heavy stops (leaving them as [ʔ]), fricatives (leaving them [h] or, if they were voiced, [ɦ]). Similar to these is the change of liquids to the voiced glides [y w], depending on their place of articulation.

There is a problem with chain shifts, which appear to be almost the only way that certain fricatives--[f̬ þ̬ ð̬], if not [v̬], arise. (Similarly, [ç̬] is generated only in higher-level unmarkings--assimilation, in this case.) Given that such changes begin gradually, in accord with Principle 2, one must ask how a language-user knows that a given change is but the first step in a shift, rather than a single change, say of /b/ to [v̬]. Do changes begin one way, and then get converted to another species? Or are all such changes potentially chain changes, always affecting certain classes of fricatives before others? Much empirical evidence is yet needed to answer such questions.

Another aspect of these questions is that languages seem to group into two classes of related prosodic phenomena. The A class has either no accent or one which does not combine pitch and length; syllable-timed rhythm; little vowel-weakening; unmarked syllabication (open syllables); rising diphthongs (falling diphthongs would close syllables); liaison; full voicing of light consonants next to boundaries and consonantal lenition; and voice assimilation of an obstruent to a following obstruent. There is a basic distinction between open and closed syllables, if the latter exist in type A languages. In type B languages, one finds a heavy accent usually combining pitch and length (so-called 'stress'); accent-timed rhythm; vowel-weakening, syllabic sonorants, and syncope; marked syllabication, with consonants clustering around accented nuclei; falling diphthongs; apocope; devoicing of light obstruents next to boundaries and consonant strengthening (as the High German consonant shift). Here there is a basic distinction between open and loosely closed syllables (the latter heard in sane, deep) vs. tightly closed

syllables (e.g. sanity, depth). See further on accent in Jakobson 1968:33. Contrast the assimilation in French opserver and English obzerver, slipt, maps. (Lost and left have a peculiar history in that the penultimate obstruent in each was the underlying one; it became an obstruent of the light order in lose and leave between vowels.) In type A languages /x/ palatalizes before front vowels and vowels often nasalize after nasal consonants; in type B languages, /x/ palatalizes after front vowels (e.g. German), and vowels often nasalize before nasal consonants.

Note that 'r-less' English distinguishes marked and unmarked syllabication of underlying obstruents, the former syllabication (agreeing with that of obstruents) being used for special cases, viz. where a glide is generated from a single underlying vowel or where a satellite liquid results from a vowel-deletion (Bailey 1968a). In French, where all consonants prefer unmarked syllabication in lento tempo, we find marked syllabication being used for special cases; contrast normal [wi] in oui with [u^i] in bouille (where an earlier lateral has been lost). Latin changed from type A to type B in Romance, perhaps as the result of many losses of unaccented vowels. Portuguese seems to be changing, for whatever cause, back to a type A language, with vowel-weakening and falling diphthongs (and few rising ones; cf. Port. fogo with Span. fuego 'fire').

25. The writer's conventions for marking ternary (non-prosodic and prosodic) phonetic features, which markings depend on a segment's position in the syllable and on the marking of heavier-weighted features, are given in the Appendix. The definitions could be replaced with natural rules (see §3.1; cf. the natural processes of Stampe 1969).

26. Although it has been fashionable in post-Saussurian circles to think of sense and sound as the content and expression of the grammar (somewhat reversing the relation of form and matter in scholastic thought), we may think of both semantics and phonetics as the matter of the grammar with respect to content and of phonetics and morphonology as the matter and form of the grammar with respect to its expression.

27. Cf. also the seven points listed in Weinreich et al. 187-8.
28. It will become evident in §3 that rate in the present discussion is far from having any connection with the use of this term in glottochronology, between which and his own position the writer would admit no connection.
29. Dying languages exhibit the opposite directionality, as once-categorical rules become variable (Dressler 1972). This development is [- natural].
30. I am taking it for granted that mixtures of systems spoken by native speakers--i.e. creoles--may occur in different proportions and degrees, like the process of decreolization, which consists of recreolizing the basilect and the mesolects with the acrolect. Let scientists borrow pairwise from German (helped by English otherwise, which, however, is a de-adjectival adverb), and let -wise become a productive formative in ordinary speech for deriving adverbs from nouns, and this is creolization! But one would not wish to speak of creolization where only a few lexical items were borrowed--in fact, not until relexification reached massive proportions, the amount probably depending on the social situation--because, as Bloomfield (1933:274) noted, the lexicon is a list of irregularities, of exceptional and other unpredictable aspects of a language. For new insights into the systematicity of the lexicon, see now Labov 1973.
31. For the different species of creolization and a brief discussion of decreolizing gradatums and other issues under consideration here, cf. Bailey 1973a. See also the end of §4.4.
32. Unmarked is abbreviated u: marked, m; and, in a ternary system, over-marked is M. My usual practice is to place lexical phonological representations inside double slants, representations for some point in a derivation between underlying lexical representations and phonetic outputs in single slants, and phonetic outputs themselves in square brackets. Names of features are also enclosed within square brackets.
33. Formalisms for indicating feature weighting in rules, together with comments on how relative

weightings are ascertained, are found in the Appendix. See also on the coefficients ⊂ and ⊃ below. Kim 1966:82-83 has proposed the coefficient ω for polar opposites; if ω stands for plus, then $\underline{\omega}$ (not $\underline{\omega}$) will stand for minus, and conversely. A method of calculating environment weightings is outlined in the Appendix and illustrated in the text later on.

34. All $\underline{u}$ values are equally unweighted; there are no differences resulting from different feature weightings.

35. Specifying that the segments follow a nucleus is necessary because of the different markings of place and manner features of obstruents in the special positions (immediately following a tautosyllabic accented vowel, where the marked value of [nuclear] is minus; and preceding another obstruent in the prenuclear part of a syllable) and in other environments. Thus, apical consonants are more expected immediately before tautosyllabic vowels than labials; and these are more expected in this environment than velars. But in the special positions, except for fricatives, velar consonants are more expected than labials, and these than apicals. See the Appendix. Since Rumanian opt (from *octō) cannot rightly be ascribed to assimilation, as has been claimed, this change constitutes something of a problem for the present view of marking, although it is confirmed by a vast number of changes, attested slips of the tongue, etc.

36. When speech becomes extremely unmonitored as the result of haste, fatigue, or emotional upsets, marked phenomena progressively get replaced by the corresponding unmarked phenomena. In terms of the concepts proposed by Stampe (cf. fn. 25), who first theorized on the matter, haste, fatigue, and emotional upset break down the monitored suppression of natural rules, which are then permitted to operate freely. Some natural rules are given at the end of §3.1 in an implicational formalism. Studies of different sorts have established that victims of the apraxia of speech may exhibit changes which occur in a sequence which reverses the sequence of their acquisition by most children. And

Sasanuma & Fujimura 1971, building on older studies, have carried on additional investigations to show that the functional losses of ideograms and phonograms are not parallel in Japanese. The systematicity of the 'disintegration' of speech (e.g. in slips of the tongue) is sufficient to indicate that even performance variables are predictable and may some day be included in grammars. Undoubtedly some changes in languages begin as slips of the tongue or unintended unmarkings in unmonitored speech, just as others (over-corrections; see below) begin in over-monitoring. Predictions relating to such matters properly belong to a theory of linguistic competence, in my opinion. Unmarking should soon account for the things which Sapir (1921) discussed under the rubric of 'drift', as well as the so-called 'conspiracies' of more recent vintage.

37. There is, of course, nothing 'unnatural' or unusual in such borrowings. As already noted, borrowings have the mid value of the feature [natural].

38. The directionality of change from marked to unmarked may be set aside in borrowing between language systems--creolization--as already observed. Also, as the basilect or mesolects decreolize through borrowing from the matrilect, items that were unmarked in the lower-status lects may get marked, reversing the directionality of natural change.

The reconstructive task may present a special type of problem, which can be illustrated by the problem of deciding whether the word-final nasal in PIE was *m or *n. This is a problem because the markedness of the different nasals is different in most environments from what is found in the special position following tautosyllabic accented vowels (it is quite comparable to the same special position for obstruents; cf. fn. 35). Contrast the usual changes of /m/ to /n/ to [ŋ] in the word-final environment (Chen MSb: diagram 1) with the change of /ŋ/ to [n] in allegro tempos after unaccented vowels in English. Where a language permits a neutralized word-final nasal after accented and unaccented vowels alike, as PIE does, either nasal

could--so far as is now known--be generalized to the other by a 'crazy rule' of the sort discussed in Bach & Harms 1972. It is premature to try to guess whether the directionality of such generalizing processes will be predictable under constraints yet to be discovered.

39. Principle 2b may well be connected with the general application priority of 'properly inclusive' formulations over those included by them according to the principle first proposed by Gerald A. Sanders (according to Koutsoudas, Sanders, & Noll 1971:10). This general principle accords well with the principle governing the application of disjunctive notations in Chomsky & Halle 1968:30 (since discussed in Anderson 1969), as well as the so-called A-over-A principle in syntax.

40. The feature is [w.b.]. See below on the effects of the morpheme boundary in pas+t. To obviate a confusion into which some glottometrists have fallen, it may help to state that there is no phonetic clustering at the end of crank ['khr$\tilde{æ}^{\tilde{I}}$k], work ['wɝ:k 'wə^{I}:k 'wɹk], and board ['bo^{ə}:d 'bo^{ə}d] ([o] is over-rounded in BVE and Deep Southern White speech; [b] is injective in BVE and fortis in Deep Southern White pronunciation). Contrast the lateral cluster in old ['o^{u}l(d)] and build ['b+^{I}:(d)] in BVE and Southern pronunciation. In the rules that follow, # symbolizes an internal and ## an external word boundary.

41. The feature [u nuclear] denotes vowels in this environment; [m nuc] indicates non-vowels, which class includes boundaries as well as consonants. A number of factors which are ignored in the rules may be mentioned; since the rules are purely illustrative here, incorporating these complications would not serve the purpose or be compensated by any advantages. Investigators of both BVE and Southern States White English have found that the deletion of a clustered word-final apical stop is more likely if it ends an unaccented syllable than if it ends an accented syllable; e.g. b:·akfas(t), fores(t), den(t)is(t), fastes(t), ribal(d), husban(d), and diamon(d). (The first /t/ in dentist is deleted by another rule irrelevant to this discussion,

but discussed below in connection with sentence.) My own researches of English in the Southern States indicate not only that the deletion of /t/ clustered with a preceding obstruent and of /d/ clustered with a preceding /n/ or lateral is least likely before /h/ or a vowel; but also that the deletion is normal only before an obstruent (e.g. wastepaper, restful, left goal, handbag, windmill, oldster; cf. acts, opts, rafts, etc.) or a nasal or lateral (e.g. goldmine, landlocked, shiftless, exactly, softly, least likely, first news, worst mess). (But epenthesis may restore a lost /d/ in handler.) Before /y/, the deletion of an apical stop depends on whether the palatalization rule follows (e.g. jus' yet, las' year) or precedes rule 3; in the latter case, we have [st^{š}] or [št^{š}] in just yet and last year, as well as in question, bestial, etc. Note that /t/ is always palatalized in the last examples, as well as in vesture, etc. Before /r/ and /w/, the deletion of a clustered apical stop depends on the syllabication, which differs for the two sonorants when they are followed by an unaccented vowel. Compare the retention of syllable-initial /t d/ before /r/ in vestry (contrast ves'ment), laundry, and foundry with their variable deletion (more likely in more rapid tempos) when syllable-final before /w/, as in westward and landward. Before /r w/ plus accented vowels, there are two possible syllabications of clustered apical stops; cf. once tried, run dry, twice twenty, tool drawer with jus(t) right, lan(d) rights, mus(t) win, trus(t)worthy, and gol(d) rush.

Note that in normal tempos the difference between the presence of [t] in the phonological type exemplified in piston and pistol and the absence of [t] in the type exemplified by mois(t)en and nes(t)le (where no underlying vowel follows /t/) may be eliminated through a reordering which causes the deletion of /t/ in restin' and--if the speaker is 'r-less'--in western. For further complications of this rule, see Bailey 1973c.

42. Note that the heaviest and lightest environments are the same in both 4a and 4b, while the middle environments are reversed (cf. Labov 1972a:124).

Table 1 is brought into accord with Principle 8b (§3.2) in Table 4 below (§4.1).

43. Some of the writers just cited have also arrived at the position, first advocated in Stampe 1969, that unmarked ordering is equivalent to non-ordering. The point will be amplified later (§3.1).

Since this writing was submitted to the publisher, a conference on rule ordering has taken place at the University of Indiana (April, 1973). The publication of papers from that conference will be of supreme interest to readers interested in rule ordering.

44. In addition to the examples of different rule orderings that either differentiate lects of English or mark off lexical exceptions from other lexical items in the same lect which are given below, cf. Bailey MSb, where thirty or forty such differences are listed.

45. The change does not occur in American 'r-léss' lects before the geminate /r/ which is automatically generated in American and British English between /ə/ and a following vowel, as in covering, Southern States ['kh$_{\Lambda}$və$_{\text{r}}$r$_{\text{r}}$ɪn]. See Bailey MSc for details of this process, which also affects the other sonorants.

46. In the Southern States, a lateral which is non-nuclear at the stage of derivation where rule v applies is not affected by the rule when it follows a heavy (tense) rounded back nucleus; e.g. tool ['thʉ$^{\text{U}}$l], mule ['mü$^{\text{U}}$l], gule ['gi$^{\ddot{\text{U}}}$l], goal ['go$^{\text{U}}$l], ball ['bɔl 'bɒ$^{\text{O}}$l], and howl ['hæ$^{\text{O}}$l] (contrast Northern ['thu$^{\text{ɫ}}$ː], etc., where rule v has applied). But a syllabic lateral, generated out of unaccented /əl/, is affected by rule v even in such environments; e.g. dualist ['dyu$^{\text{ɫ}}$l$_{\text{r}}$st] and dual ['dyu$^{\text{ɫ}}$ː], from /'di$^{\text{U}}$ɫ/ from /'di$^{\ddot{\text{U}}}$ɫ/ from /'di$^{\text{U}}$əl/ from /dual/, as in duality. In like fashion are generated fluid ['flʉ'd] and poet ['pho't] from /'flu$_{\text{r}}$d/ (cf. fluidity) and /'po$_{\text{r}}$t/ (cf. poetic). Not only is rule v more general than formulation v in these respects: it also applies to /r/, as in pore ['pho$^{\ə}$ː] and Jer' ['d$^{\check{\text{z}}}$ɛ$^{\ə}$ː], with [$^{\ə}$ː] from [$^{\ɚ}$] by the late desulcalization rule; contrast 'r-less' Southern

porous ['phoᵘrəs] and Jerry ['dᶻɛrɪ], where rule v has not applied, with the 'r-ful' pronunciations ['phoᵊrəs] and ['dᶻɛᵊri], where the gemination of //r// before a vowel has created an environment in which rule v (in its more general formulation affecting //r// as well as //l//) can operate. Compare the parallel gemination of //l// and the operation of rule v in dualist above and in Northern silly ['sɨlːi] (contrast Southern ['sɪlɪ]). (The length mark is omitted between such geminates.) An example with //r// that parallels dual above is mower ['moᵊ 'moᵊː] from /'moᵊ/ from /'moər/.

47. A later Southern States rule deletes /l/ in all but lento tempos in the environment, V́ __ y V̆, where V̆ is an unaccented vowel. The change of heavy //ā// (cf. prevail) to /ă/ in value is due to trisyllabic lightening; in valiant, it makes sense only if the strong cluster /ly/ is created before the application of the rule that lightens nuclei in this environment, since normally a non-high vowel becomes heavy before unaccented /ĭ/ followed by a vowel.

48. For valiant and million the illustration here requires replacing rule vi with a rule that changes unaccented syllabic sonorants (including high vowels) to their corresponding non-nuclear phones before unaccented vowels. Thus, in the unmarked ordering, the substitute rule vi would change /'valiənt 'miliən/ to /'valyənt 'milyən/, and rule v would convert this into /'vaɨːyənt 'miɨːyən/, which later rules would change to the phonetic output of Northern States English: ['væɨːyət 'mɨɨːyən]. Contrast Southern States ['væ(l)yət 'mɪ(l)yən]. Note that even a word boundary does not count as a non-vowel: Southern States tell#it ['thɛlɪt], hill#y ['hɪlɪ]. The justification for the # in hilly is given in Bailey MS; note that a phonological-phrase boundary does cause rule v to operate in the South as well as elsewhere. Note the operation of the late rule described in fn. 47 across the word boundary in will you ['wɪyə -yə].

49. It may not be amiss to observe that a good theory

is a good discovery procedure. In addition to examples later in this article, the following may be instanced. Standard and non-standard pronunciation in the Southern States change /z/ to /d/ in isn't, doesn't, hasn't, and wasn't. Non-standard pronunciation also has a rule, absent in standard pronunciation, that changes /d/ to /t/ in the same environment (as in couldn't and shouldn't), which is converted finally to a glottal stop by a rule which is found in most parts of the United States. Since non-standard Southern States English has the two main rules in their unmarked order, so that /z/ → /d/ → /t/, the analyst is naturally led to seek relics of an earlier situation in which the rules had their marked mutual ordering. This would be a lect with ['ɪdn̩t] for isn't and ['ʃʊ.ʔn̩t] for shouldn't. Note also that holes in implicationally ordered natural developments lead the linguist to seek the representative lects, either to corroborate or to discorroborate some aspect of his theory of language.

50. Creole studies are confirming the independence of the components. The independence of the lexicon has long been recognized; cf. now Gumperz & Wilson 1971. Carol Odo (MS) has found that young Hawaiian children may pronounce the velar nasal in the formative -ing, a phonological trait of formal style, while at the same time deleting the copula, a syntactic characteristic of informal speech. Cf. also Sasanuma & Fujimura (see fn. 36).

51. It is also probable that all adult-acquired linguistic phenomena are marked. If true, this would mean that adults would have as much trouble learning the apical trill as the more marked uvular trill, which in Europe has been borrowed to replace the apical one.

52. Cf. Sapir 1921:174: "We may venture to surmise that while whom will ultimately disappear from English speech, locutions of the type Whom did you see? will be obsolete when phrases like The man whom I referred to are still in lingering use". (I am indebted to William Peet for this citation.) The Grecist will be familiar with the facts in Lejeune 1955:148-56, showing that in Ancient Greek *w was progressively deleted in an implicationally pat-

terned succession of environments. These can be generated with variable rules.

53. Charles Ferguson (personal communication) has found in Ethiopia three results of a change in the usual position of the verb from its older location. Neighboring languages exhibit the following temporally successive situations: (a) the expected relation between verb position and pre/postpositions has been obliterated; (b) an interim alternation between prepositions and postpositions has resulted; (c) a readjustment of the particle position has resulted in the expected implication.

54. Elsewhere I have employed the coefficients [↑] and [↕] for gradient (ternary-valued) features in intonational analysis (cf. Bailey MS). The first use of such arrows was by Fred Householder (personal communication) in another connection.

55. Contrast my Principle 1b with the way Schachter employs the natural value; and note that the assimilated [+ nasal] is [m nasal] in the vowel, but [u nasal] in the consonant in the special position.

56. Principle 9a is evidently counterintuitive, since a lighter-weighted feature, or one with the least effects on a rule's operation, is obviously very close to being generalized--i.e. irrelevant to the rule. The writer began with this assumption, but the variable segment in the environment of rule 11 below shows why 9a has been proposed. Here a generalized [nasal] includes [u nasal], the last environment to become operative and the slowest of the three operative environments (before reweighting occurs). Hence, the feature specifying the slowest environment, the lightest, must be the last feature in the variable segment of the environment to be generalized. No doubt further investigation will show a way to make Principle 9a generalize lighter-weighted features before heavier ones.

There is a psychological problem, related to one discussed in fn. 24. This is the question of how a language-user knows that [nasal] is a variant in rule 11 so long as it has only its marked value and the nasal environment has not become effective in the rule. Unless the language-user

already knows that [nasal] is the lightest feature on the basis of its relative weighting in other rules of the lect, it does not seem possible that he or she would know this until [nasal] generalized and the nasal environment came into play; but one will, of course, then know that it is the lightest-weighted feature in the environment segment.

57. It is a matter that awaits future investigation to determine which instance of a feature environing either side of an input is the one to be affected by Principle 9. It seems unlikely that the same feature could have different weightings in one part of a given rule, but until the relevant examples have been investigated in detail, this matter has to be left up in the air.

58. Features are heavier or lighter, but environments are not only heavier and lighter, but faster and slower according to their relative heaviness. Since environment weightings depend not only on feature weightings but also on their values (see fn. 87), a heavier feature may be faster or slower than a lighter one according to its plus, mid, or minus values. In order for heavier-weighted variable features to have greater effects on the rate, it is necessary, as explained in §3.3, for lighter variable features to change (reverse) their values oftener than heavier ones. This seems to contradict Principle 10a, but it should become clear below that it does not; see Principle 13 in §3.3. A more formal statement of Principle 10 (using F for feature, W for weight, R for rate, and parentheses for variability) is: (a) Where $W_{(F_j)} > W_{(F_i)}$, then: $R_{(F_j)} > R_{(F_i)}$; (b) where $[\alpha F_i]$, then: $R_{m,M} > R_u$; and (c) where $[\supset F_i]$, $R_+ > R_X > R_-$, and where $[\subset F_i]$, $R_- > R_X > R_+$. (Cf. also Principle 19 in §4.1.)

59. The reader is cautioned that a quite different analysis is found in Labov 1972a. Using a kind of vowel-space continuum, as it does, it may be more in accord with the new framework than the present analysis. But acoustical research (e.g. Stevens 1968) over the past years has convinced the writer

that there are optimal articulatory points having quantal acoustic results which dominate the phonologies of particular languages in that the ideal places of articulations for their sounds tend to converge at such points. (Cf. also Fromkin 38-39 and fnn. 17 and 81.) To assert that a speech sound has an idealized articulatory focus or target is not to deny that such sounds are actualized as a compromise between such ideal targets and the targets of adjacent sounds, in accordance with a temporal factor and a coefficient for the degree to which the target of the sound being articulated can be affected by other sounds. Note that the phonetic rules in Öhman 1967 include a temporal factor! All of this is quite another matter from asserting that there are phonological features which are non-scalar and there are phonetic features which are scalar, since (if the present position is correct) there are as many phonetic targets for a feature as there are phonological values of it.

60. The marking of [pharyngeal widening] or 'tenseness' in vowels is not without its problems. While it is true that languages lacking the distinction between 'tense' and 'lax' accented vowels normally have only the former, it is also indubitably true that 'tense' vowels are preferred in open accented syllables, while 'lax' ones are more expected in closed accented syllables. But this last may be some sort of assimilatory phenomenon. Since rule 11 tenses /æ/ mainly in closed syllables, it appears to contravene Principle 1a. Note that this change rarely affects paroxytonic syllables, which, however, are in English also closed if an obstruent follows the accented vowel.

61. The rule would progress quite well through three environments if the environment were specified as [⊃ continuant], but this would not happen in the right sequence. Even if this were not a problem, changes in the rate of the three environments and the acceleration which is described below could not be generated without the features in rule 11 and the principles of generalization and reweighting proposed here.

62. The situation is quite different with Greek-letter

variable coefficients, since a generalization of the unmarked value to the marked as well as unmarked values causes an acceleration of the marked values ahead of the unmarked one, in accordance with Principle 10b.

63. Besides monosystematic speech communities, there are two kinds of polysystematic speech communities. One has closely related overlapping systems in use. This is the decreolizing gradatum. Another polysystematic speech community has several unrelated or distantly related language systems in use. If this situation persists for long, a kind of creole would be expected to develop (cf. Gumperz and Wilson 1971).

64. 'R-lessness' refers to the presence of rule iv above; 'r-ful' speakers have the sulcal peak and satellite [ə ᵊ] in barter, mere, mirror, etc.

65. Psycholinguists ought to be able to tell us whether it is easier for Irish speakers, who alternate [e] and [ɛ] in mean : meant to understand lects in which the alternation here is between [i] and [ɛ] than conversely.

66. One would like to know whether users of English who have a four-way distinction between informal 'Suzie', less informal 'Susan', more formal 'Miss Susan', and most formal 'Mrs. Jones' are able to deal more competently with the three-way distinction lacking 'Miss Susan' than conversely.

67. It is probable today that most adult varieties of BVE are in the last stage of decreolization; i.e. the BVE system has only a minimal difference from the system found among cultured Blacks and Whites and uncultured Whites.

68. Lects in which [ᵊ] is heard after the nuclear peak in carm, palm, and walnut have a different explanation which in fact also supports the view of an internalized polylectal grammar. These lects belong to 'r-ful' speakers who have had a great deal of contact with 'r-less' speech--or whose progenitors have had this contact. From the phonetic outputs ['kha:m 'kha:m 'pha:m 'phɒ:m 'wɔ:nət], the language-users in question have inferred underlying /parm karm wɒrnut/ on the basis of pairs like card ['kha:d 'khɒ:d] and ['kha:ᵊd 'khɒᵊd] in their (understanding) competence.

69. Principle 14 implies a cerebral organization of variation in terms of sets within sets--Venn diagrams. Any such storage principle in the brain would severely constrain the kinds of variation tolerated in languages. Note that it has been found that variant signs used by the deaf form an implicational series (Woodward MS).
70. The causes may be linguistic (cf. Wang 1969:135) or social.
71. Fig. 5 is a spatial presentation. If Fig. 5a were a Venn diagram (cf. fn. 69), the opposite implication would obtain: $\underline{A} \supset \underline{B} \supset \underline{C}$.
72. In order to avoid the confusion that is current on both sides of the fence dividing sociologists from linguists, it should be stressed that, whatever problems deviant cases like the famous Nathan B. (Labov 1966:249-53) present for the sociolinguist or sociologist, such cases present no problems for the linguist, provided the subgrammars of such deviant language-users are among the subgrammars (perhaps they are the subgrammars used by other sociological groupings) generated within the overall grammar of the language.
73. One expects the light order of vowels in closed syllables; hence the heavy order is marked in the input of rule 21. There is, however, evidence that [pharyngeal width] (note its use in rule 11 for 'tenseness') is not the most appropriate feature for the distinction between heavy and light nuclei. The 'laxing' or 'lightening' of the heavy vowels (cf. deep, serene) in depth and serenity is due to rhythmic shortening (see feature 36 in the Appendix). In depth, the lengthened cluster that follows shortens the nucleus; in serenity, the demands of accent-timed rhythm shorten accented nuclei as one or more unaccented syllables follow. This rhythmic shortening is gradient and accelerates the operation of rule 21, since later outputs are heard in Friday and writing than in died, flies, and night. But the non-gradient, or decremental, shortening of nuclei that results from being followed by tautosyllabic heavy obstruents (see feature 25 in the Appendix) retards the operation of rule 21; so later outputs are heard in bribe and ride than in ripe and write. Kolb's data reveal

another aspect of gradient shortening (input [⊂ rhythmic length]) in that /ī/ has later outputs in right-handed and wheelwright than in night (see fn. 74 for fight). Later outputs are heard in -wright, whose mid-accented status makes it shorter than a fully accented syllable, than in right-, which is shorter because of the following not fully accented syllable. For the effects of shortening on the Martha's Vineyard equivalent of rule 21, see Labov 1972:123. For the Southern States, see fn. 76.

74. A comparison of Table 8 with Fig. 10 will show that the change spread from the South northward. Where [a] is present for a given word in the southern part of the six northern counties, [i] in that word has already been pushed out of the North of England. The words employed in this study are not entirely consistent with other words of the same general type. In contrast with sky (where we find mostly [a^e]), eye has more [i] pronunciations than [a^e], and most of the [a^e] pronunciations are North of the [i] ones. It is not impossible that the old velar in eye slowed down the change there. But when we compare night (mostly [i]) with fight (almost all [$ɛ^i$]), this explanation hardly holds up, and we must suspect whether the preceding labial in fight hastens the nuclear change. There is a known problem with velar environments, discussed below, since the fastest environments for the rule are the velar and prevelar satellites, while the slowest environment for obstruents is the velar one. It is unlikely that reweighting would affect single lexical items. For right-, see fn. 73.

75. In connection with this, it should be pointed out that Lehiste 1970:20 shows that, other things being equal, vowels are universally shorter before labials than before apicals and velars. This means that what looks like incremental shortening has the accelerating effects of gradient rhythmic shortening in rule 21, where labial environments are the fastest. As for the accelerating effects of gradient rhythmic shortening in paroxytones, other examples are known. DeCamp 1959:60 found that in San Francisco there are speakers who pronounce naughty like knotty while still preserving the

distinction of caught and cot. The writer has also observed a speaker from Washington, D.C., who has [ɑ] in foggy but [ɔ] in fog.

76. The effects of rhythmic shortening are discernible in the Southern States only in clitics (our is more likely to be [ˌa^{ə}ː] than hour is) and in modifiers preceding their heads in rising tunes. Compare [a^{e}] (Charlestonian [ə^{i}]) in united (where /t/ has become [d]) and ninety (where /t/ is deleted) with [a] (Charlestonian [ɑ^{e}]) in United States and in ninety-nine. In the last items rule 22 has the unmarked ordering after the changes of /t/ found in these words. Note typewriter, where the first two syllables both have [a^{e}] (Charlestonian [ɑ^{e}]) in the descending tune. (See further Joos 1942.)

Since pint (cf. ninety in fn. 75) has [ã^{ẽ}], not [ã] in cultivated pronunciation in most of the Southern States, it is necessary to assume either (1) that rule 22 follows the deletion of nasals when these are followed by tautosyllabic heavy (underlying voiceless) obstruents, or (2) that rule 22 operates in the environment of a following devoiced nasal in the same way that it operates in the environment of a following heavy obstruent.

It may be noted here that Charlestonian English has palatal [c ɟ] before front vowels (including [aː] from /ar/ as in card, but not before [ɑ^{e}] in kite and [ɑ^{o}] in cow) and in girl (which is fronted in British English and is heard by some Japanese as gyoru). Substandard pronunciation has the palatals before [æ^{o}] (which is standard elsewhere in the South) in cow and before all instances of [ɝ]--not just girl, but also curl, gird, etc. (Charlestonian is 'r-less' except for [ɝ], a frequent situation.)

77. Fig. 11 is based in part on the data in Kurath & McDavid 1961, but the writer has added necessary supplements and emendations from his own observations. In Fig. 11 heavier-weighted outputs are written beneath lighter-weighted ones.

78. Table 8 has not solved all the problems involved in such portrayals. The suspicious absence of [a] for about in lects -1, -3, and -5 may indicate that

they should have been placed to the left of 0, instead of to the right of it.

79. This was discovered and first discussed by Labov (1966).

80. Prenasalized stops like [^{m}b] are [- cnt] and [+ trb]; fricative nasals are [+ cnt, + trb]. All of these are [+ nas]. Fricative laterals and trills are [+ trb]. Some rules treat plain nasal consonants as [= cnt] segments, grouping them with continuants; other rules treat nasal consonants as [∓ cnt] segments, grouping them with stops.

81. If the trill-tap difference could ever be shown to involve reweighting, this would be evidence that the difference involves different features, since feature values presumably cannot reweight. A further complication is posed by the tentative inclusion of flaps as well as taps under the mid value of feature 15 above.

82. But [x trb] is highly marked here.

83. But when before [+ nas]: [+,u cnt] and [-,m cnt].

84. But [x trb] is highly marked here.

85. This expectation can be changed by polar oppositions, since languages with two kinds of wide-grooved sibilants normally have the convex-dorsum ([+ dor]) and concave-dorsum ([- dor]) opposites. Some varieties of Portuguese prefer postnuclear [š] to [s]; cf. Swiss German in both special positions.

86. The view that phonological and phonetic features differ by being fixed-valued and scalar, respectively, has introduced into linguistic discussions a number of confusions that could well have been avoided. Cf. further fnn. 17 and 59.

87. Larger numerical operators, whether negative or positive, have greater effects on the rate of a rule than smaller ones, whether negative or positive. But the effect of the positive or negative sign attached to such a numerical operator is seen in the actual calculus of the weight of a given environment.

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